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CALIFORNIA STATE MINING BUREAU

FERRY BUILDING, SAN FRANCISCO

FLETCHER HAMILTON

State Mineralogist

San Francisco]

BULLETIN No. 70

[July, 1915

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Mineral Production for 1914

With Mining Law Appendix

COMPLIMENTS OF
F. MCN. HAMILTON
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LETTER OF INTRODUCTION.

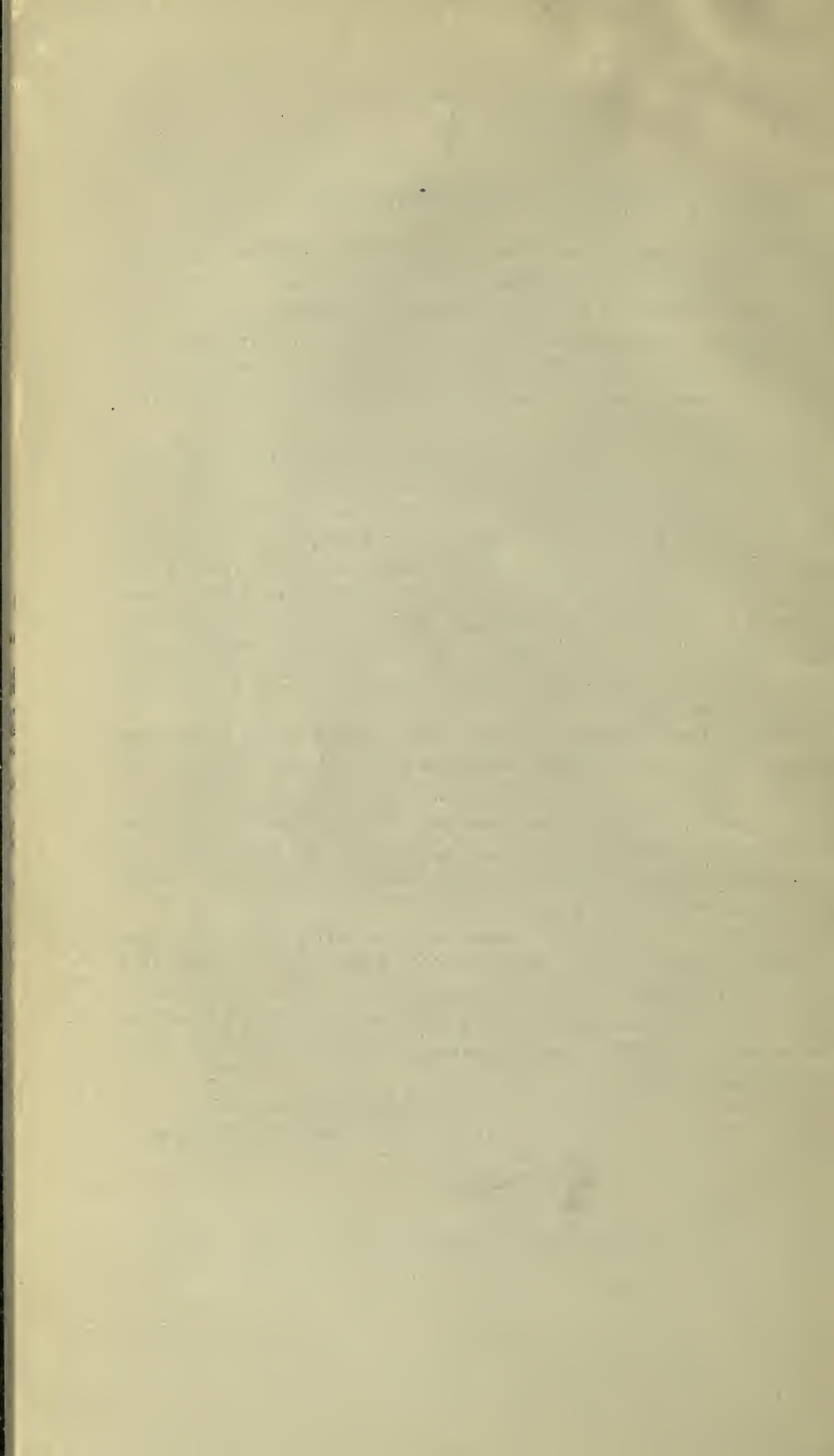
The Bulletin herewith presented of the mineral industries of California is the result of a painstaking effort to so compile the statistics of production that they will be of actual use to producers and to those interested in the utilization of the mineral products of our State. In addition to the mere figures of output, we have included descriptions of the uses and characteristics of many of the materials, as well as a brief mention of their occurrences.

The compilation of accurate and dependable figures is an extremely difficult undertaking, and the State Mineralogist takes the opportunity of here expressing his appreciation of the universal co-operation of the producers in making this work possible. The response to our request for early replies this year, especially on account of distributing the report at the Expositions being held here, is particularly pleasing; and has enabled the results to be published earlier than in former years. A fuller appreciation of the value of early responses to the request sent out at the beginning of each year, will result in earlier publication of the data in the future.

It is the evidence herein put forth that should make us realize the magnitude of our latent mineral resources in this State. Though the total value for 1914 reached the sum of, approximately, ninety-five and a half million dollars, it was a decrease of some five million dollars from that of 1913. This is not due to a falling off in any single item, but to the general business depression which pervaded the entire country for the greater part of the year.

For the current year of 1915 there is a noticeably improved tone, particularly in gold mining. Except for the year 1883, the gold yield for 1914 was the largest California has shown since 1864. In addition to this many inquiries are being received relative to this State's resources in the industrial minerals, such as asbestos, chrome, magnesite, manganese and many others.

FLETCHER HAMILTON,
State Mineralogist.



MINERAL INDUSTRY, CALIFORNIA, 1914

DATA COMPILED FROM DIRECT RETURNS FROM
PRODUCERS IN ANSWER TO INQUIRIES SENT
OUT BY CALIFORNIA STATE MINING
BUREAU, FERRY BUILDING,
SAN FRANCISCO, CAL.

CHAPTER ONE

Mineral production in California during the year 1914 amounted to \$93,436,553 worth of crude materials. There were forty-two different mineral substances, and of the fifty-eight counties in the State all but two contributed some mineral product.

The total value was less than that of 1913 by \$5,208,086, owing to the general depression in business. Demand for mineral products varies with activity in other lines of industry. The mineral products which fell off most from the preceding year were petroleum, cement, copper, and stone of various sorts.

The decrease in price of oil caused its decline in total value, though there was an increase in the amount produced. The other three products mentioned fell off in amount as well as value.

The figures of the State Mining Bureau are made up from reports made by the producers of the various minerals. Care is exercised in avoiding duplication, and any error is doubtless upon the side of underestimation.

It would be folly to attempt to set a limit of maximum mineral production for California, because the mineral resources are so extensive and have been so slightly developed along many lines.

The following table shows the yield of mineral substances of California for 1914, as compiled from the returns received at the State Mining Bureau, San Francisco, in answer to inquiries sent to produce

Substance	Amount	Value
Asbestos -----	51 tons	\$1,5
Barytes -----	2,000 tons	3,0
Bituminous rock -----	66,119 tons	166,6
Borax -----	62,500 tons	1,483,5
Brick -----	270,791 M	2,288,2
Cement -----	5,109,218 bbls.	6,558,1
Chromite -----	1,517 tons	9,4
Clay -----	179,948 tons	167,5
Coal -----	11,859 tons	28,8
Copper -----	30,491,535 lbs.	4,055,3
Feldspar -----	3,530 tons	16,5
Fuller's earth -----	760 tons	5,9
Gems -----		3,9
Gold -----		20,775,0
Gypsum -----	29,734 tons	78,3
Infusorial earth -----	12,840 tons	80,3
Iron ore -----	1,436 tons	5,1
Lead -----	4,697,400 lbs.	183,1
Lime -----	439,961 bbls.	378,6
Limestone -----	572,272 tons	517,7
Magnesite -----	11,438 tons	114,3
Manganese -----	150 tons	1,5
Marble -----	25,436 cu. ft.	48,8
Mineral paint -----	132 tons	8
Mineral water -----	2,443,572 gals.	476,1
Natural gas -----	16,529,963 M. cu. ft.	1,049,4
Petroleum -----	102,881,907 bbls.	47,487,1
Platinum -----	330 oz.	14,8
Potash -----	10 tons	4
Pumice stone -----	50 tons	1,0
Pyrites -----	79,267 tons	230,0
Quartz -----	2,500 tons	4,8
Quicksilver -----	11,373 flasks	557,8
Salt -----	223,806 tons	583,5
Sand, fire, etc. -----	26,038 tons	17,8
Sandstone -----	111,691 cu. ft.	45,3
Silver -----		814,2
Soapstone -----	1,000 tons	4,5
Soda -----	6,522 tons	115,3
Stone, miscellaneous* -----		4,860,3
Tungsten ore -----	4,830 tons	180,5
Zinc -----	399,641 lbs.	20,3
Total -----		\$93,436,5

*Including granite, macadam, rubble, paving blocks, sand, and gravel.

**Estimated. See supplement to Chapter Three—Metals, pp. 33, 34.

The following table shows the comparative value of minerals produced in California during the years 1913 and 1914:

Substance	1913	1914	Increase	Decrease
Asbestos -----	\$1,175	\$1,530	\$355	
Barytes -----	3,680	3,000		\$680
Bituminous rock -----	78,479	166,618	88,139	
Borax -----	1,491,530	1,483,500		8,030
Brick -----	2,915,350	2,288,227		627,123
Cement -----	7,743,024	6,558,148		1,184,876
Chromite -----	12,700	9,434		3,266
Clay -----	261,273	167,552		93,721
Coal -----	85,809	28,806		57,003
Copper -----	5,343,023	4,055,375		1,287,648
Feldspar -----	7,850	16,565	8,715	
Fuller's earth -----	3,700	5,928	2,228	
Gems -----	13,740	3,970		9,770
Gold -----	20,406,958	20,775,000*	368,042	
Graphite -----	25			25
Gypsum -----	135,050	78,375		56,675
Infusorial earth -----	35,968	80,350	44,382	
Iron ore -----	4,485	5,128	643	
Lead -----	160,202	183,198	22,996	
Lime -----	528,547	378,663		149,884
Limestone -----	274,455	517,713	243,258	
Magnesite -----	77,056	114,380	37,324	
Manganese -----		1,500	1,500	
Marble -----	113,282	48,832		64,450
Mineral paint -----	1,780	847		933
Mineral water -----	599,748	476,169		123,579
Natural gas -----	1,053,292	1,049,470		3,822
Petroleum -----	48,578,014	47,487,109		1,090,905
Platinum -----	17,738	14,800*		2,938
Potash -----		460	460	
Pumice -----	4,500	1,000		3,500
Pyrites -----	218,537	230,058	11,521	
Quartz rock -----	7,756	4,800		2,956
Quicksilver -----	630,042	557,846		72,196
Salt -----	462,681	583,553	120,872	
Sand, glass -----	14,143	17,888	3,745	
Sandstone -----	27,870	45,322	17,452	
Silver -----	832,553	814,230*		18,323
Soapstone -----	6,150	4,500		1,650
Soda -----	24,936	115,396	90,460	
Stone, miscellaneous -----	6,168,020	4,860,357		1,307,663
Tungsten ore -----	234,673	180,575		54,098
Zinc -----	64,845	20,381		44,464
Totals -----	\$98,644,639	\$93,436,553		
Net decrease -----				\$5,208,086

*Estimated. See supplement to Chapter Three—Metals, pp. 33, 34.

The following table shows the comparative value of the mineral production of the various counties in the State for the years 1913 and 1914.

County	1913	1914
Alameda	\$844,217	\$870,427
Alpine	541	
Amador	3,013,180	3,230,073
Butte	2,533,940	1,755,311
Calaveras	2,042,901	2,068,344
Colusa	48,481	32,251
Contra Costa	1,962,640	1,149,321
Del Norte	2,514	5,270
El Dorado	67,723	150,086
Fresno	8,438,810	7,484,231
Glenn	27,776	30,553
Humboldt	471,052	233,574
Imperial	95,054	239,140
Inyo	1,942,309	2,091,362
Kern	28,406,193	28,047,957
Kings	1,335	740
Lake	125,829	63,508
Lassen	2,382	4,324
Los Angeles	5,833,298	4,665,509
Madera	371,867	203,517
Marin	278,453	554,137
Mariposa	246,079	187,870
Mendocino	9,450	560
Merced	35,329	112,500
Modoc	6,875	1,730
Mono	184,428	17,150
Monterey	178,679	113,837
Napa	1,186,353	971,743
Nevada	2,950,367	3,329,179
Orange	6,948,495	8,831,764
Placer	520,808	1,099,743
Plumas	143,698	164,809
Riverside	2,071,969	1,579,586
Sacramento	2,925,706	2,632,653
San Benito	514,995	436,253
San Bernardino	2,486,100	1,614,600
San Diego	315,694	315,267
San Francisco	110,551	119,883
San Joaquin	165,157	129,930
San Luis Obispo	63,675	63,467
San Mateo	215,371	246,473
Santa Barbara	3,636,288	2,686,306
Santa Clara	311,383	266,950
Santa Cruz	1,816,805	1,642,953
Shasta	6,212,344	5,044,930
Sierra	1,010,976	733,000
Siskiyou	309,986	384,753
Solano	1,839,721	1,683,860
Sonoma	239,037	326,144
Stanislaus	272,249	5,882
Sutter		
Tehama	2,442	300
Trinity	435,142	753,743
Tulare	119,760	161,253
Tuolumne	1,198,383	1,059,118
Ventura	924,972	1,000,729
Yolo		730
Yuba	2,507,139	2,820,890
Unapportioned	17,738	1,530 14,800
Totals	\$98,644,639	\$93,436,554

a—Includes gold and silver production of Stanislaus. b—See Merced. c—Asbestos from Alameda, Calaveras, El Dorado, Placer, Shasta. Amounts not separable. d—Platinum from Butte, Del Norte, Sacramento, Siskiyou, Yuba. Amounts not separable. See also supplement to Chapter Three—Metals, p. 33.

CHAPTER TWO

FUELS

The most important mineral products of California are its fuels. This subdivision includes coal, natural gas and petroleum, the combined values of which make up approximately 50 per cent of the State's entire mineral industry. Comparison of values during 1913 and 1914 is shown in the following table:

Substance	1913	1914	Decrease
Coal -----	\$85,809	\$28,806	\$57,003
Natural gas -----	1,053,292	1,049,470	3,822
Petroleum -----	48,578,014	47,487,109	1,090,905
Totals -----	\$49,717,115	\$48,565,385	\$1,151,730

Coal.

Reference: State Mineralogist Reports VII, XII, XIII.

Coal has been produced in California since as early as 1860, but the quality is not high, most of it being lignite. In competition with fuel-oil, coal of all grades has had to give way, and the low-grade domestic product has suffered severely.

During 1914, there was a production reported from Amador, Contra Costa, Monterey and Siskiyou counties, totaling 11,859 tons, worth \$28,806, most of it, however, coming from Amador and Monterey counties.

Since 1887, the annual output of coal has been as follows:

Year	Tons	Value	Year	Tons	Value
1887 -----	50,000	\$150,000	1902 -----	88,460	\$248,622
1888 -----	95,000	380,000	1903 -----	93,026	265,383
1889 -----	121,280	288,232	1904 -----	79,062	376,494
1890 -----	110,711	283,019	1905 -----	46,500	144,500
1891 -----	93,301	204,902	1906 -----	24,850	61,600
1892 -----	85,178	209,711	1907 -----	23,734	55,849
1893 -----	72,603	167,555	1908 -----	18,496	55,503
1894 -----	59,887	139,862	1909 -----	49,389	216,913
1895 -----	79,858	193,790	1910 -----	11,033	23,484
1896 -----	70,649	161,335	1911 -----	11,047	18,297
1897 -----	87,449	196,255	1912 -----	14,484	39,092
1898 -----	143,045	337,475	1913 -----	25,198	85,809
1899 -----	160,941	420,109	1914 -----	11,859	28,806
1900 -----	176,956	535,531			
1901 -----	150,724	401,772	Totals -----	2,054,720	\$5,689,900

Natural Gas.

Reference: State Mineralogist Reports VII, X, XII. Bulletin 6, 19, 69.

Statistics on the production of natural gas in California are little better than a guess. The figures here given are certainly below the actual production, particularly in the six oil-producing counties. It is an exceptional oil property where gas in some quantity does not occur. Many oil producing concerns make no mention of their gas, because they have no method of measuring it, and it is widely used in the oil fields that it is frequently as lightly regarded as sunshine or fresh air. Doubtless, considerable gas is wasted, but a sweeping condemnation of operators should not be indulged in. It must be remembered that several of our important oil fields are removed many miles from the site of any other industry, and that the gathering of small amounts of gas and transporting it for any considerable distance, may not always be profitable. However, it is undoubtedly a fact that greater saving can frequently be made for profit. Gas traps of various size and design are coming into more frequent use. Some large operators are making commendable effort to conserve the gas which accompanies oil and is richer than the so-called "dry gas" occurring in strata which do not produce oil.

It will be noted that several counties produce gas which is not accompanied by oil.

The value of gas as here shown is open to considerable question and is certainly not too high. The average price is about 6¢ per 1,000 cubic feet. Seven thousand cubic feet of gas is about equal to one barrel of oil in heating value, and is so accounted for by many operators.

Natural Gas, 1914.

County	M. cu. ft.	Value
Fresno	250,000	\$10,000
Humboldt		
Kern	6,508,868	39,053
Kings	150	900
Los Angeles	1,250,000	7,500
Orange	1,867,336	11,204
Sacramento	80,000	4,800
San Joaquin	154,872	9,292
Santa Barbara	6,313,380	37,880
Solano	5,357	32
Ventura	100,000	6,000
Totals	16,529,963+	\$1,040,000

The annual production of natural gas in California since 1888 is as follows:

Year	Value	Year	Value
1888 -----	\$10,000	1903 -----	\$74,237
1889 -----	12,680	1904 -----	91,035
1890 -----	33,000	1905 -----	102,479
1891 -----	30,000	1906 -----	109,489
1892 -----	55,000	1907 -----	114,759
1893 -----	68,500	1908 -----	474,584
1894 -----	79,072	1909 -----	616,932
1895 -----	112,000	1910 -----	1,676,367
1896 -----	111,457	1911 -----	491,859
1897 -----	62,657	1912 -----	940,076
1898 -----	74,424	1913 -----	1,053,292
1899 -----	95,000	1914 -----	1,049,470
1900 -----	34,578		
1901 -----	92,034		
1902 -----	99,443	Total -----	\$7,764,424

Petroleum.

Reference: Bulletins 3, 11, 16, 19, 31, 32, 63, 69; State Mineralogist Reports IV, VII, X, XII, XIII.

Chief of the fuels of California is petroleum. A complete description of the industry is to be found in Bulletin 69, recently issued by the State Mining Bureau.

In preparing the statistics for the year 1914, several sources of information were available for comparison and use. Several marketing concerns issue carefully prepared monthly statements of gross production in each field, and this department gathers figures on price and other matters, directly from oil producers. The figures here given on gross production and monthly operations, are largely those published by the Independent Oil Producers Agency, and the figures showing well operation by fields are from the Standard Oil Company. Segregation of figures by counties can be made directly from field reports in all cases except for Los Angeles and Orange counties, where the fields cross county lines. Figures on price are open to some question, as it must be remembered that a large portion of the oil does not enter the open market, but is consumed or refined directly by the producers. The prices given are averages for the oil which is actually sold.

The business of producing oil is not so profitable as it should be. Many operators continue to drill wells when there is not a great demand, and the over-production, of course, depresses the price. Just profits and stable conditions are more nearly assured to the producer who is able to refine and retail his product. Realization of this fact is apt to lead to the formation of larger and stronger business units in the future. Doubtless, undue obstacles will not be placed in the way of

such changes, if they are carried out with reasonable regard to public welfare. The fact can not be too strongly emphasized that our resources are far from inexhaustible, and that needless production hastens the day when we shall stand stripped of one of our most valuable assets. Raising oil from the ground and selling it at a price to return the invested capital with interest, is about the same as mining gold from a savings account and disposing of it at a discount. In most lines of human endeavor, some operators have entered the business with more thought and preparation for the future than others.

Production and Value of Oil by Counties.

County	1913		1914	
	Bbbs.	Value	Bbbs.	V
Fresno -----	18,956,965	\$7,927,736	15,952,190	\$7,
Kern -----	58,698,432	27,038,474	65,332,633	26,
Los Angeles -----	4,143,690	2,672,680	3,558,690	1,
Orange -----	9,485,362	6,867,402	12,758,678	8,
Santa Barbara -----	6,291,076	3,151,725	4,325,787	1,
Santa Clara -----	20,000	12,000	10,000	
Ventura -----	899,007	907,997	943,929	
Totals -----	98,494,532	\$48,578,014	102,881,907	\$47.

Average Price of Oil by Counties.

County	1913	1914	Inc Dec
Fresno -----	41.8¢	45.2¢	
Kern -----	46.0¢	40.9¢	
Los Angeles -----	64.5¢	55.0¢	
Orange -----	72.4¢	67.5¢	
Santa Barbara -----	50.0¢	46.0¢	
Santa Clara -----	60.0¢	53.0¢	
Ventura -----	101.0¢	105.0¢	
State average -----	49.3¢	46.1¢	

The annual production since discovery is as follows:

Year	Barrels	Year	Barrels
1875 -----	175,000	1896 -----	1,257,780
1876 -----	12,000	1897 -----	1,911,569
1877 -----	13,000	1898 -----	2,249,088
1878 -----	15,227	1899 -----	2,677,875
1879 -----	19,858	1900 -----	4,329,950
1880 -----	40,552	1901 -----	7,710,315
1881 -----	99,862	1902 -----	14,356,910
1882 -----	128,636	1903 -----	24,340,839
1883 -----	142,857	1904 -----	29,736,003
1884 -----	262,000	1905 -----	34,275,701
1885 -----	325,000	1906 -----	32,624,000
1886 -----	377,145	1907 -----	40,311,171
1887 -----	678,572	1908 -----	48,806,910
1888 -----	690,333	1909 -----	58,191,723
1889 -----	303,220	1910 -----	77,697,568
1890 -----	307,360	1911 -----	84,648,157
1891 -----	323,600	1912 -----	89,689,250
1892 -----	385,049	1913 -----	98,494,532
1893 -----	470,179	1914 -----	102,881,907
1894 -----	783,078		
1895 -----	1,245,339	Total -----	762,489,115

The total value is as follows:

Year	Value
1887-1909 -----	\$136,693,228
1910 -----	37,689,542
1911 -----	40,552,088
1912 -----	41,868,344
1913 -----	48,578,014
1914 -----	47,487,109
Total -----	\$352,868,325

Production by Fields.
(Barrels 42 gallons.)

Field	1913	1914	Inc. + Dec. —
Kern River -----	10,499,509	7,227,422	3,222,087—
McKittrick -----	4,520,549	3,871,352	649,197—
Midway-Sunset -----	39,277,370	49,408,493	10,131,123+
Lost Hills-Belridge -----	5,272,630	4,825,366	447,264—
Coalinga -----	18,696,110	15,952,190	2,743,920—
Santa Maria-Lompoc -----	4,843,683	4,266,387	577,296—
Ventura County-Newhall -----	1,009,633	943,929	65,704—
Los Angeles-Salt Lake -----	2,942,684	2,456,937	485,747—
Whittier-Fullerton -----	10,685,146	13,860,431	3,175,285+
Summerland -----	59,400	59,400	-----
Watsonville -----	20,000	10,000	10,000—
Totals -----	*97,776,714	102,881,907	5,105,193+

*Total used by Bureau last year, 98,494,532 barrels.

Well Operations by Months, 1914.

Month	Completed number	Producing		Drilling	
		Active	Idle	Active	Abandoned
January -----	31	5,781	1,508	263	
February -----	44	5,787	1,525	241	
March -----	34	5,802	1,529	234	
April -----	33	5,847	1,512	279	
May -----	63	5,879	1,494	255	
June -----	45	5,954	1,487	239	
July -----	38	5,988	1,488	239	
August -----	29	5,985	1,530	226	
September -----	30	5,829	1,713	198	
October -----	32	5,817	1,744	176	
November -----	23	5,826	1,765	161	
December -----	36	5,909	1,697	147	
Totals, 1914 -----	438				
Totals, 1913 -----	627				
Monthly av., 1914 -----	37	5,867	1,588	222	
Monthly av., 1913 -----	52	5,880	1,154	349	

Well Operation by Fields, 1914.

Field	Producing Dec., 1913	Producing Dec., 1914	Inc.	Dec.	Completed
Kern River -----	1,397	1,385	-----	12	15
McKittrick -----	254	251	-----	3	9
Midway-Sunset -----	1,214	1,376	162	-----	206
Lost Hills-Belridge -----	185	240	55	-----	49
Coalinga -----	867	815	-----	52	30
Santa Maria-Lompoc -----	221	235	14	-----	6
Ventura-Newhall -----	409	442	33	-----	35
Los Angeles-Salt Lake -----	682	687	5	-----	9
Whittier-Fullerton -----	514	568	54	-----	62
Summerland -----	122	102	-----	20	-----
Watsonville -----	5	5	-----	-----	-----
Totals -----	5,870	6,106	236	-----	421

The proportion of heavy and light oil produced in the various is shown by the following figures, for which we are indebted to Standard Oil Company. Oil below 18° Baumé may be generally sidered as unrefinable, or fuel, oil; while the lighter oils yield var amounts of refined products and a very large proportion of resid or fuel oil. A very few years ago, the total amount of heavy oil w excess of the light oil.

Production of Light and Heavy Oil by Fields.

Field	Per cent	Under 18°, bbls.	Per cent	18° and above, bbls.	Total bbls.
Kern River -----	100	7,030,545	0	-----	7,030,545
McKittrick -----	100	3,820,857	0	-----	3,820,857
Midway-Sunset -----	21	10,554,589	79	39,471,254	50,025,843
Lost Hills-Belridge -----	2	96,877	98	4,734,044	4,830,921
Coalinga -----	45	7,113,471	55	8,812,416	15,925,887
Lompoc and Santa Maria -----	12	499,635	88	3,803,445	4,303,080
Ventura County and Newhall -----	11	111,208	89	857,213	968,421
Los Angeles and Salt Lake -----	96	2,407,855	4	96,620	2,504,475
Whittier-Fullerton -----	2	232,271	98	13,898,277	14,130,548
Summerland -----	100	55,743	0	-----	55,743
Watsonville -----	0	-----	100	27,375	27,375
Totals -----	31	31,923,051	69	71,700,644	103,623,695

Financial results of the oil business during 1914 are shown by the following tables to be not greatly different from those of 1913, as published in Bulletin No. 69. It is particularly worthy of notice that the profitable, or dividend-paying, companies received a slightly higher price for their product than the average market price, probably due to the higher grade of oil produced by them. It is also noticeable that their production cost per barrel is slightly lower than the average, due to the fact that their wells are more productive. Operating cost per well is not always lower for the dividend companies than others. Profitable operations seem to depend generally upon large wells, high-grade oil, and proximity to market. There is nothing to indicate that unnatural causes or manipulations have affected the profits of one producer against another. It should be particularly noted that both price and profits are greater in the Los Angeles and Orange County fields than in others. Doubtless this is largely due to the proximity to market.

There is a large supply of oil now in storage which, in many cases, might better be left in the ground and not subjected to losses by fire, leakage and evaporation as well as cost of storage. According to the Standard Oil Company, the stocks on hand on December 31st, amounted to 58,526,274 barrels, which is an increase of 10,656,097 barrels during the year. The figures are practically the same as those of the Independent Oil Producers Agency. The oft-repeated statement that this is less than a year's supply is of little moment in the face of a steady production which can supply the regular demand. It would be extremely interesting to know what portion of the stock on hand is low-grade oil. In view of the difference in value and marketableness of various grades of oil, the concerns publishing monthly statistics would render to the public and themselves a distinct service by showing something of the amounts of high and low gravity oil produced and stored.

Financial and Operating Condition of California Oil Fields, 1914.

Field	No. of companies considered	Per cent of total pro- duct of companies considered	Capital	
			Cash	Pro
Coalinga -----	55	55	\$9,013,130	\$9
Kern River -----	60	38	6,433,818	3
Midway -----	78	41	4,319,634	19
Sunset -----	33	-----	2,260,571	7
McKittrick, Belridge-Lost Hills -----	19	50	894,970	9
Santa Maria, Lompoc, Summerland -----	14	73	3,593,280	19
Ventura -----	22	57	1,000,053	2
Los Angeles, Orange -----	26	25	3,195,260	4
Sub-totals -----	307	-----	\$30,710,716	\$76
Miscellaneous and marketing -----	30	-----	65,868,180	57
Totals -----	337	-----	\$96,578,896	\$133

	1909		1910		1911		1912		1913		1914	
	Com- panies	Value	Com- panies	Value	Com- panies	Value	Com- panies	Value	Com- panies	Value	Com- panies	Value
Coalinga -----	17	\$1,287,244	16	\$1,366,243	14	\$1,236,338	15	\$1,154,328	17	\$956,098	15	\$1,048,840
Kern River -----	22	1,123,129	24	392,472	22	389,822	26	454,065	19	361,414	20	205,258
Midway -----	4	101,000	10	562,763	18	1,076,285	19	1,128,161	14	520,520	25	917,981
Sunset -----	3	21,527	5	127,212	7	211,339	7	319,220	3	91,936	5	106,152
McKittrick, Belridge and Lost Hills -----	2	269,795	2	239,750	1	85,000	2	134,945	6	538,744	8	493,339
Santa Maria, Lompoc and Summerland -----	4	894,125	5	1,548,236	5	1,000,141	6	374,720	8	500,976	6	480,534
Ventura County -----	1	11,790	1	22,067	2	46,252	2	26,393	2	54,720	4	125,832
Los Angeles and Orange counties -----	12	1,203,556	13	1,427,908	12	1,288,034	12	878,478	14	3,015,159	13	2,453,981
Sub-totals -----	65	\$4,912,166	76	\$5,686,651	81	\$5,333,211	89	\$4,470,340	83	\$6,039,597	96	\$5,891,917
Miscellaneous and marketing com- panies -----	6	10,440,331	6	2,981,598	5	2,830,403	7	4,401,218	8	9,509,009	9	9,384,308
Totals -----	71	\$15,352,497	82	\$8,668,249	86	\$8,163,614	96	\$8,871,558	91	\$15,548,606	105	\$15,276,225

Prices of Light and Heavy Oil and Operating Costs.

Field	Price			Operating cost			
	Under 180 Baume (cents)	Over 180 Baume (cents)	Average price (cents)	All companies		Dividend companies	
				Ibbls. per well per day (cents)	Per well day (dollars)	Ibbls. per well per day (cents)	Per well day (dollars)
Coalinga -----	39.7	54.0	45.2	48.6	10.13	65.8	12.58
Kern River -----	32.9	-----	32.9	11.3	1.99	14.5	2.03
Midway -----	40.7	41.7	41.3	63.5	9.19	14.5	9.70
Sunset -----	35.7	44.6	43.8	88.3	12.80	14.5	6.70
McKittrick, Belridge and Lost Hills -----	38.0	51.6	45.6	44.3	4.85	44.8	3.94
Santa Maria, Lompoc and Summerland -----	40.7	47.2	46.0	43.9	5.08	11.6	4.81
Ventura* -----	-----	109.5	109.5	8.1	2.78	12.27	2.14
Los Angeles and Orange counties -----	51.8	63.0	64.7	25.7	4.86	28.2	5.19

*Prices include receipts from other sources than oil (about 4 cents too high).

CHAPTER THREE.

METALS.

The total value of metals produced in California during 1914 was \$26,606,533. The chief of these is gold, followed in order by copper, silver, quicksilver, lead, tungsten, zinc, platinum, and iron. Deposits of ores of antimony, molybdenum and vanadium are also to be found in the State, although for 1914 there was no commercial output of these materials.

California leads all states in the Union in her gold production and the precious metal is widely distributed throughout the State. Thirty-two of the fifty-eight counties contain actively operated gold mines.

Copper, which is second in importance among the metals of the State, occurs in the following general districts: the Shasta County belt, which is by far the most important; the Coast Range deposits, extending more or less continuously from Del Norte in the north to San Luis Obispo County in the south; the Sierra Nevada foothill belt, starting in Plumas and running in a general southerly direction through the Mother Lode counties and ending in Kern; the eastern belt in Mono and Inyo counties; and the southern belt, in San Bernardino, Riverside and San Diego counties.

Silver is not generally found alone in the State, but is almost invariably associated to a greater or less extent with gold, copper and lead. Quicksilver, while comparatively small in the value of its annual output, has for many years been one of the State's staple products and California supplies about 80 per cent of the nation's output of this metal.

Tungsten likewise is found in but few other localities.

Large deposits of iron ore have long been known in many sections of the State, but for various economic reasons this branch of the mineral industry is still in its infancy here.

A comparison of the metal output with that of 1913 is afforded by the following table:

Metal	1913		1914		Inc. + or dec.
	Amount	Value	Amount	Value	
Copper -----	34,471,118 lbs.	\$5,343,023	30,491,535 lbs.	\$4,055,375	\$1,287,648
Gold -----		20,406,958		20,775,000*	368,042
Iron ore ----	2,343 tons	4,485	1,436 tons	5,128	644
Lead -----	3,640,951 lbs.	160,202	4,697,400 lbs.	183,198	22,996
Platinum ---	368 oz.	17,738	330 oz.	14,800*	2,938
Quicksilver -	15,661 flks.	630,042	11,373 flks.	557,846	72,196
Silver -----		832,553		814,230*	18,323
Tungsten ore	7,592 tons	234,673	4,830 tons	180,575	54,098
Zinc -----	1,157,947 lbs.	64,845	399,641 lbs.	20,381	44,464
Totals -----		\$27,694,519		\$26,606,533	\$1,087,986

*Estimated. See supplement, pp. 33, 34.

Antimony.

Reference: Bulletin 38. State Mineralogist Reports XII, XIII.

Antimony is known to exist in a number of places in California, having been reported from Kern, Inyo, Riverside, San Benito, and Santa Clara counties. The Kern County deposits, some of which carry metallic antimony, are possibly the best known, and efforts were made to work some of them before California was a part of the United States. The commonest occurrence is in the form of the sulphide, stibnite. No production, however, has been maintained, and none was reported for 1914. The high price of antimony since the European war (36.5¢, July 1, 1915) has caused considerable interest in this metal, and future developments may be expected. Recent advices indicate a commercial production for the current year, 1915, as some Kern County ore is being smelted at a plant in Los Angeles.

During the years 1887-1901 various small lots of antimony ore were mined and sold, amounts and values being shown in the following table:

Year	Tons	Value
1887 -----	75	\$15,500
1888 -----	100	20,000
1893 -----	50	2,250
1894 -----	150	6,000
1895 -----	33	1,485
1896 -----	17	2,320
1897 -----	20	3,500
1898 -----	40	1,200
1899 -----	75	13,500
1900 -----	70	5,700
1901 -----	50	8,350
Totals -----	680	\$79,805

Copper.

Reference: Bulletins 23 and 50. State Mineralogist Reports VII, XIII.

Copper is one of the staple mineral products of the State, being produced chiefly in Shasta County, and a much smaller amount coming from Calaveras County. Sixteen counties in all report some production. The production during 1914 was 30,491,534 pounds, valued at 13.3¢ per pound, totalling \$4,055,374; which is a decrease in both amount and value from the previous year, the 1913 price having been 15.5¢. The European war caused a decrease in copper mining for a time, which has been counteracted by renewed activity more recently. The same cause has also raised the price from the 1914 average of 13.3¢ above given, to 16.3¢ for the first six months of 1915, the closing June figure being 20.0¢.

Further efforts have been made during the past year in the improvement of methods of handling the smelter smoke; and recent reports

indicate a resumption of the large plant of the Balaklala company Shasta County.

Distribution by counties for 1914 follows:

County	Pounds	Value
Amador	5,215	
Calaveras	4,468,998	59
Imperial	13,081	
Inyo	336,423	4
Kern	7,394	
Lassen	19,089	
Madera	35,359	
Mariposa	277,472	3
Nevada	39	
Placer	453	
Plumas	150,000	1
Riverside	36,102	
San Bernardino	19,669	
San Diego	30	
Shasta	25,122,766	3,34
Tuolumne	45	
Totals	30,491,535	\$4,05

Amount and value of copper production in California annually since such records have been compiled by the State Mining Bureau is given in the following tabulation:

Year	Pounds	Value
1887	1,600,000	\$19
1888	1,570,021	23
1889	151,505	1
1890	23,347	
1891	3,397,455	42
1892	2,980,944	34
1893	239,682	2
1894	738,594	7
1895	225,650	2
1896	1,992,844	19
1897	13,638,626	1,54
1898	21,543,229	2,47
1899	23,915,486	3,99
1900	29,515,512	4,74
1901	34,931,788	5,50
1902	27,860,162	3,23
1903	19,113,861	2,52
1904	29,974,154	3,96
1905	16,997,489	2,65
1906	28,726,448	5,52
1907	32,602,945	6,34
1908	40,868,772	5,35
1909	65,727,736	8,47
1910	53,721,032	6,68
1911	36,838,024	4,60
1912	34,169,997	5,63
1913	34,471,118	5,34
1914	30,491,535	4,05
Totals	588,027,956	\$84,18

Gold.

Reference: All State Mineralogist Reports. Bulletins 36, 45, 57.

Gold is one of the most important mineral products of California, and its early discovery undoubtedly was the prime cause of the rapid development of the State. There is a marked tendency toward increased activity in gold mining, as investors realize that many of the mines and prospects have not been exhausted. It is absolutely necessary that owners of prospects and small mines, who wish to dispose of their property or see it developed, should realize that most large investments of that sort are made only after thorough investigation. Frequently, demands for large cash payments have turned away capitalists who would otherwise have been willing to risk an equal amount in development work.

The State Mining Bureau has never independently collected statistics of gold, platinum and silver production, as there is no necessity for duplicating the very thoroughly organized work of the U. S. Geological Survey covering those metals. In order to expedite the issuing of this publication, the Survey's data not yet being available, the production of precious metals is here estimated,* the figures being close enough for ordinary commercial purposes. About 60 per cent of the yield is from the "deep," or quartz, mines, the balance being from placers, this latter designation also including the dredges.

*See supplement at end of this chapter, pp. 33, 34.

The total production for 1914 is estimated at \$20,775,000, an increase of approximately \$370,000 over 1913; and was distributed by county about as follows:

County	Value
Amador	\$3,10
Butte	1,70
Calaveras	1,40
Del Norte	
El Dorado	13
Fresno	1
Humboldt	1
Imperial	20
Inyo	27
Kern	60
Lassen	
Madera	
Mariposa	13
Merced and Stanislaus*	11
Modoc	
Mono	
Monterey	
Nevada	3,30
Placer	60
Plumas	14
Riverside	1
Sacramento	2,17
San Bernardino	20
Shasta	1,10
Sierra	73
Siskiyou	31
Trinity	75
Tuolumne	95
Yuba	2,80
Total	\$20,77

*Merced and Stanislaus combined to conceal output of a single dredge in each county.

Total Gold Production of California.

The following table was compiled by Chas. G. Yale, of the Division of Mineral Resources, U. S. Geological Survey, but for a number of years statistician of the California State Mining Bureau and the U. S. Mint at San Francisco. The authorities chosen for certain periods were: J. D. Whitney, state geologist of California; John Arthur Phillips, author of "Mining and Metallurgy of Gold and Silver" (1867); U. S. Mining Commissioner R. W. Raymond; U. S. Mining Commissioner J. Ross Browne; Wm. P. Blake, Commissioner from California to the Paris Exposition, where he made a report on "Precious Metals" (1867); John J. Valentine, author for many years of the annual report on precious metals published by Wells Fargo & Company's Express; and Louis A. Garnett, in the early days manager of the San Francisco refinery, where records of gold receipts and shipments were kept. Mr. Yale obtained other data from the reports of the director of the U. S. Mint and the director of the U. S. Geological Survey.

Survey. The authorities referred to, who were alive at the time of the original compilation of this table in 1894, were all consulted in person or by letter by Mr. Yale with reference to the correctness of their published data, and the final table quoted was then made up. The figures of the last nine years are those prepared by the U. S. Geological Survey, except for 1914, which is estimated:

Year	Value	Year	Value
1848 -----	\$245,301	1883 -----	\$24,316,873
1849 -----	10,151,360	1884 -----	13,600,000
1850 -----	41,273,106	1885 -----	12,661,044
1851 -----	75,938,232	1886 -----	14,716,506
1852 -----	81,294,700	1887 -----	13,588,614
1853 -----	67,613,487	1888 -----	12,750,000
1854 -----	69,433,931	1889 -----	11,212,913
1855 -----	55,485,395	1890 -----	12,309,793
1856 -----	57,509,411	1891 -----	12,728,869
1857 -----	43,628,172	1892 -----	12,571,900
1858 -----	46,591,140	1893 -----	12,422,811
1859 -----	45,846,599	1894 -----	13,923,281
1860 -----	44,095,163	1895 -----	15,334,317
1861 -----	41,884,995	1896 -----	17,181,562
1862 -----	38,854,668	1897 -----	15,871,401
1863 -----	23,501,736	1898 -----	15,906,478
1864 -----	24,071,423	1899 -----	15,336,031
1865 -----	17,930,858	1900 -----	15,863,355
1866 -----	17,123,867	1901 -----	16,989,044
1867 -----	18,265,452	1902 -----	16,910,320
1868 -----	17,555,867	1903 -----	16,471,264
1869 -----	18,229,044	1904 -----	19,109,600
1870 -----	17,458,133	1905 -----	19,197,043
1871 -----	17,477,885	1906 -----	18,732,452
1872 -----	15,482,194	1907 -----	16,727,928
1873 -----	15,019,210	1908 -----	18,761,559
1874 -----	17,264,836	1909 -----	20,237,870
1875 -----	16,876,009	1910 -----	19,715,440
1876 -----	15,610,723	1911 -----	19,738,908
1877 -----	16,501,268	1912 -----	19,713,478
1878 -----	18,839,141	1913 -----	20,406,958
1879 -----	19,626,654	1914 -----	*20,775,000
1880 -----	20,030,761		
1881 -----	19,223,155		
1882 -----	17,146,416	Total -----	\$1,608,862,904

*Estimated. See supplement at end of this chapter, pp. 33, 34.

Iron Ore.

Reference: State Mineralogist Reports II, IV, V, X, XII, XIII. Bulletin 38.

Iron ore to the extent of 1,436 tons, valued at \$5,128, was produced in Shasta County during the year 1914. This was smelted by the electrical process.

There are considerable deposits of iron ore known in California, but production has never amounted to much, on account of our having no economic supply of coking coal. Developments along the line of electrical smelting, or discoveries making valuable our petroleum fuel, would lead to considerable increase of iron mining in California.

Total iron ore production in the State, with annual amounts values, is as follows:

Year	Tons	Value
1893 -----	250	
1894 -----	200	
1907 -----	400	
1909 -----	108	
1910 -----	579	
1911 -----	558	
1912 -----	2,508	
1913 -----	2,343	
1914 -----	1,436	
Totals -----	8,382	\$

Lead .

Reference: State Mineralogist Reports IV, VIII, X.

Lead was produced in the year 1914, to the extent of 4,697 pounds, which at 3.9¢ per pound, was valued at \$183,198, being a considerable advance over the previous year. The principal production comes from Inyo County, where the base ores are mined and sent to smelters. On account of the European war, the price has increased to around 6¢ per pound, since the close of 1914.

County returns for 1914, showing amounts and values in each instance, are as follows:

County	Pounds	Value
Amador -----	44	
Butte -----	513	
Calaveras -----	30	
El Dorado -----	90	
Inyo -----	4,626,934	183,198
Kern -----	379	
Nevada -----	145	
Placer -----	385	
Plumas -----	2,058	
San Bernardino -----	45,110	
Shasta -----	21,565	
Siskiyou -----	58	
Tuolumne -----	89	
Totals -----	4,697,400	\$183,198

Statistics on lead production in California were first compiled by this Bureau in 1887. Amount and value of the output, annually, with total figures, to date, are given in the following table:

Year	Tons	Value
1887	580	\$52,200
1888	450	38,250
1889	470	35,720
1890	400	36,000
1891	570	49,020
1892	680	54,400
1893	333	24,975
1894	475	28,500
1895	796	49,364
1896	646	38,805
1897	298	20,264
1898	328	23,907
1899	360	30,642
1900	520	41,600
1901	360	28,820
1902	175	12,230
1903	55	3,960
1904	62	5,270
1905	266	25,083
1906	169	19,307
1907	164	16,690
1908	562	46,663
1909	1,343	144,897
1910	1,508	134,082
1911	701	63,173
1912	685	61,653
1913	1,820	160,202
1914	2,349	183,198
Totals	17,125	\$1,428,875

Molybdenum.

Reference: Bulletin 67, "Molybdenite."

Molybdenum is used to a limited extent in the steel industry, and also as a base for the tungsten filaments in electric bulbs. Deposits of disseminated molybdenum ores have been observed in several localities in California, but no commercial production has been attempted to date, on account of the difficulties of concentrating the sulphide.

The above reference gives detailed data on occurrence, characteristics, etc., of this material.

Platinum.

Reference: State Mineralogist Reports XII, XIII. Bulletins 38, 45.

Platinum is a by-product from California's placer operations for gold. As explained under the heading of Gold, the State Mining Bureau does not collect the statistics on platinum, but it is safe to estimate that about 330 ounces were produced during 1914, which came from Butte, Del Norte, Sacramento, Siskiyou, and Yuba counties.

There have been occasional reports of platinum being found in vein materials, but as yet, no authentic case has come to the notice of our laboratory.

The annual production and value since 1887, have been as follows:

Year	Ounces	Value
1887	100	\$400
1888	500	2,000
1889	500	2,000
1890	600	2,500
1891	100	500
1892	80	440
1893	75	517
1894	100	600
1895	150	900
1896	162	944
1897	150	900
1898	300	1,800
1899	300	1,800
1901	250	3,200
1902	39	468
1903		1,052
1904		1,849
1905	200	3,320
1906	91	1,647
1907	300	6,255
1908	706	13,414
1909	416	10,400
1910	337	8,386
1911	511	14,873
1912	603	19,731
1913	368	17,738
1914	330	*14,800
Totals	7,268	\$132,434

*Estimate. See supplement at end of this chapter, pp. 33, 34.

Quicksilver.

Reference: State Mineralogist Reports IV, X, XII, XIII.

Bulletin 27. U. S. G. S., Monograph XIII.

Quicksilver was produced in nine counties in 1914, to the amount of 11,373 flasks, valued at \$557,846, which is a decrease in value from the previous year. The European war caused a considerable rise in the price of quicksilver, due to the prohibition of exports from Austria and Italy, and the retention of the Spanish output in England. Immediate steps were taken by many to reopen old quicksilver properties which had been idle for many years. Doubtless, the coming year will show a marked advance in production.

The following table of monthly San Francisco prices per flask of 75 pounds, will indicate the decided change in the status of quicksilver during the year. The average for the first six months was \$38.96 per flask, and the second half, \$59.14, or an average for the year of \$49.05.

The 1915 price will show a still greater increase. As San Francisco is the primary domestic market for quicksilver, the average yearly price on this market has always been used by the State Mining Bureau (and the U. S. Geological Survey also) in calculating the value of the State's output of this metal. The 1913 figure was \$40.23 per flask.

Month	Average price	Month	Average price
January -----	\$39 25	July -----	\$37 50
February -----	39 00	August -----	80 00
March -----	39 00	September -----	76 25
April -----	38 90	October -----	53 00
May -----	39 00	November -----	55 00
June -----	38 60	December -----	53 10

The important uses of quicksilver are the recovery of gold and silver by amalgamation, and in the manufacture of fulminate for explosive caps, of drugs, of electric appliances, and of scientific apparatus. By far the greatest consumption is in the first two mentioned.

Though some domestic yield of this metal is now obtained from Texas, Nevada and Arizona, the bulk of the output still comes from California.

The following table shows distribution by counties in 1914, with increase or decrease in amount in each instance, as compared with 1913:

County	Amount, flasks	Value	Flasks	
			Increase	Decrease
Fresno -----	148	\$7,259	-----	227
Lake -----	331	16,236	-----	64
Napa -----	240	11,772	-----	47
San Benito -----	6,633	325,349	-----	3,086
San Luis Obispo -----	1,266	62,097	106	-----
Santa Clara -----	2,407	118,063	-----	1,302
Solano -----	320	15,696	320	-----
Sonoma -----	13	638	1	-----
Trinity -----	-----	-----	-----	4
Yolo -----	15	736	15	-----
Totals -----	11,373	\$557,846	-----	-----
Net decrease -----	-----	-----	-----	4,288

The total amount and value of the quicksilver production of California since records were first compiled by the State Mining Bureau are given in the following tabulation:

Year	Flasks	Value
1887	33,760	\$1,425,000
1888	33,250	1,413,125
1889	26,464	1,190,500
1890	22,926	1,203,615
1891	22,904	1,036,386
1892	27,933	1,139,600
1893	30,164	1,108,527
1894	30,416	934,000
1895	36,104	1,337,131
1896	30,765	1,075,449
1897	26,648	993,445
1898	31,092	1,188,626
1899	29,454	1,405,045
1900	26,317	1,182,786
1901	26,720	1,285,014
1902	29,552	1,276,524
1903	32,094	1,335,954
1904	28,876	1,086,323
1905	24,655	886,081
1906	19,516	712,334
1907	17,379	663,178
1908	18,039	763,520
1909	16,217	773,788
1910	17,665	799,002
1911	19,109	879,205
1912	20,600	866,024
1913	15,661	636,042
1914	11,373	557,846
Totals	705,653	\$29,148,070

Silver.

Reference: State Mineralogist Reports IV, VIII, XII.

Silver in California is produced largely as a by-product in gaining other metals. The following figures are simply estimated, as explained

under the heading of Gold. The average price of silver during 1914 was 54.8¢ per ounce at New York:

County	Value	County	Value
Amador -----	\$18,000	Monterey -----	\$20
Butte -----	4,000	Nevada -----	27,000
Calaveras -----	60,000	Placer -----	4,500
Del Norte -----	20	Plumas -----	2,900
El Dorado -----	400	Riverside -----	100
Fresno -----	20	Sacramento -----	3,500
Humboldt -----	100	San Bernardino -----	40,000
Imperial -----	8,000	Shasta -----	345,000
Inyo -----	255,000	Sierra -----	3,000
Kern -----	10,000	Siskiyou -----	1,100
Lassen -----	10	Trinity -----	3,500
Madera -----	50	Tuolumne -----	11,000
Mariposa -----	500	Yuba -----	6,000
Merced and Stanislaus*-----	500		
Modoc -----	10	Total -----	\$814,230
Mono -----	10,000		

*Merced and Stanislaus combined to conceal output of a single dredge in each.

The value of the silver produced in California each year since 1887, is as follows:

Year	Value	Year	Value
1887 -----	\$1,632,003	1902 -----	\$616,412
1888 -----	1,700,000	1903 -----	517,444
1889 -----	754,793	1904 -----	873,525
1890 -----	1,060,613	1905 -----	678,494
1891 -----	953,157	1906 -----	817,830
1892 -----	463,602	1907 -----	751,646
1893 -----	537,157	1908 -----	873,057
1894 -----	297,332	1909 -----	1,091,092
1895 -----	599,789	1910 -----	993,646
1896 -----	422,463	1911 -----	673,336
1897 -----	452,789	1912 -----	799,584
1898 -----	414,055	1913 -----	832,553
1899 -----	504,012	1914 -----	*814,230
1900 -----	1,510,344		
1901 -----	1,229,356	Total -----	\$22,864,314

*Estimate. See supplement at end of this chapter, pp. 33, 34.

Tungsten.

Reference: Bulletins 38, 67.

Tungsten, which is used in the steel industry and in the manufacture of electrical appliances, is produced by a few operators in California. Most of the California tungsten ore is scheelite, though wolframite and hübnerite also occur. The value of the ore is based upon the content of tungstic trioxide (WO_3), and quotations are commonly made per unit of WO_3 present. In 1914 there were mined 4,830 tons, valued at \$180.575, which is a decrease from the previous year.

The annual value of tungsten produced in California since the inception of the industry is given herewith:

Year	Value	Year	Value
1905 -----	\$18,800	1911 -----	\$127,706
1906 -----	189,100	1912 -----	206,000
1907 -----	120,587	1913 -----	234,673
1908 -----	37,750	1914 -----	180,575
1909 -----	190,500	Total -----	\$1,513,936
1910 -----	208,245		

Tin.

Reference: Bulletin 67, "Cassiterite."

Tin is not at present produced in California; but during 1891-2, there was some production from a small deposit near Corona, in Riverside County, as tabulated below. Small quantities of stream tin have been found in some of the placer workings in northern California, but never in paying amounts.

Total output of tin in California:

Year	Pounds	Value
1891 -----	125,289	\$27,564
1892 -----	126,000	32,400
Totals -----	251,289	\$59,964

Vanadium.

Reference: Bulletin 67.

No commercial production of vanadium has been made in California. Occurrences of this metal have been found in the southeastern portion of the State and two companies have done considerable development work recently in the endeavor to open up paying quantities. One carrying the mineral cuprodeseloizite and reported as assaying 4% V_2O_5 , is being developed at Camp Signal, near Goffs, in San Bernardino County. There is a growing demand for vanadium, for use in the steel industry.

Zinc.

Reference: Bulletins 38, 67.

Zinc was produced principally in Inyo County during 1914, to the amount of 399,641 pounds, valued at \$20,381, which is a very marked decrease from the production of 1913.

Total production figures for zinc output of the State are as follows:

Year	Pounds	Value
1906		\$12,566
1907		10,598
1908		3,544
1911	2,679,842	152,751
1912	4,331,391	298,866
1913	1,157,947	64,845
1914	399,641	20,381
Total value		\$563,551

SUPPLEMENT TO METALS PRODUCTION.

As noted under Gold in the foregoing pages, in order not to delay the issuance of this bulletin, the output of gold, platinum and silver was estimated, the final figures not then being available. In the interim, however, and subsequent to the main portion of this report being put into type, the data have been completed and received from the United States Geological Survey, through the courtesy of Mr. Charles G. Yale, Statistician in charge of the San Francisco branch office of the Division of Mineral Resources. Anyone wishing fuller details of the production of these metals may obtain the same by applying to the U. S. Geological Survey, Washington, D. C., for a copy of the "separate" on the subject.

County	Gold. Value	Platinum. Value	Silver. Value
Amador	\$3,082,002		\$17,032
Butte	1,697,120	\$3,811	3,533
Calaveras	1,336,875	294	60,442
Del Norte	2,035	643	9
El Dorado	133,886		654
Fresno	10,231		31
Humboldt	18,686	115	57
Imperial	210,428		8,961
Inyo	265,734		258,016
Kern	594,337		8,002
Lassen	1,250		4
Madera	4,506		36
Mariposa	131,458		677
Modoc	527		5
Mono	6,821		9,089
Monterey	4,424		19
Nevada	3,301,948		26,813
Placer	597,212		4,643
Plumas	136,237		3,162
Riverside	11,230		89
Sacramento	2,164,491	7,108	3,481
San Bernardino	209,472		37,459
Shasta	1,101,202		346,706
Sierra	722,163		2,966
Siskiyou	312,842	304	1,026
Trinity	743,512	151	3,374
Tuolumne	940,793		12,017
Yuba	2,800,713	2,377	5,295
Merced and Stanislaus*	111,361		340
Totals, 1914	\$20,653,496	\$14,803	\$813,938
Totals, 1913	20,406,958	17,738	832,553

*Combined to conceal output of a single dredge in each county.

GOLD SUMMARY.

The total gold produced in California in 1914 was 999,112.95 fine ounces, valued at \$20,653,496, as compared with 987,186.59 fine ounces valued at \$20,406,985 in 1913, or an increase of 1.21%. *With the exception of 1883, this is the largest production of any year since 1864.* The "deep" or quartz mines of the State yielded 559,826.79 fine ounces of gold, valued at \$11,572,647. Of the deep mine gold 541,743.92 fine ounces valued at \$11,198,841 was derived from siliceous ore; 16,630.14 fine ounces, valued at \$343,776, was derived from copper ore; 35.37 fine ounces valued at \$731 from lead ore; 71.69 fine ounces valued at \$1,482 from silver ore; and from silver-lead ores 1,345.65 fine ounces valued at \$27,817.

The placer yield of gold in 1914 was 439,286.06 fine ounces valued at \$9,080,849. Of this \$702,884 was derived from 105 hydraulic mines; \$7,783,394 from 60 dredges; \$329,948 from 70 drift mines and \$264,623 from 105 surface or sluicing mines. The placers produced 43.97% of the total gold yield for 1914, and the deep mines 56.03% as compared with 43.30% and 56.70% for placers and deeps respectively during 1913. The dredges in the State produced 37.69% of the total gold yield from all sources in 1914, or 85.71% of the total placer gold.

SILVER SUMMARY

The yield of silver in California in 1914 was 1,471,859 fine ounces valued at \$813,938, an increase in quantity of 93,460 ounces, but a decrease in value of \$18,615. The larger portion of the output, or 1,267,752 fine ounces valued at \$701,068, was derived from crude smelting ores. The largest production of silver came, as usual, from Shasta County from the smelting of copper ores. Inyo County follows Shasta, with a yield of 466,575 ounces valued at \$258,016, derived from silver-lead ores. The silver obtained with gold in placer mining in the State in 1914 was 34,877 fine ounces valued at \$19,287. The silver recovered by amalgamation in association with gold in quartz ores was 84,421 fine ounces valued at \$46,685. The production from concentrates treated at custom mills and smelters was 22,444 fine ounces valued at \$12,411.

CHAPTER FOUR.

STRUCTURAL MATERIALS.

As indicated by this chapter heading, the mineral substances herein considered are those more or less directly used in building and structural work. California is independent, so far as these are concerned, and almost any reasonable construction can be made with materials produced in the State. This branch of the mineral industry for 1914 was valued at \$14,469,981, showing a decrease from 1913 like many other lines, owing to the financial depression. Only a few years ago its value was of no significance in considering the total mineral production of the State. With the growth, in population and otherwise, of California, this subdivision of the mineral industry in the State will increase indefinitely. Deposits of granite, marble and other building stones are distributed widely throughout the State, and slowly but surely transportation and other facilities are being extended so that the growing demand may be met. The largest single item, cement, has an unparalleled record of growth since the inception of the industry in California twenty-three years ago. Not until 1904 did the annual value of cement produced reach the million-dollar mark. It increased 500 per cent in nine years. Crushed rock production is yearly becoming more worthy of consideration, due to the strides recently taken in concrete building, as well as to activity in the building of good roads. Brick, with an annual output worth over \$2,000,000, is slowly decreasing, due to the popularity of cement and concrete; nevertheless, this item will be an important one for many years to come, and of course, a market for fire and fancy brick of all kinds will never be lacking.

The following table gives the comparative figures for the value of structural materials produced in California during the years 1913 and 1914. Forty-four counties contributed to this total, and there is not a county in the State which is not capable of a considerable output of at least one of the following classes of material.

A comparison of the annual production of the various structural materials in 1913 and 1914, is shown in the following table:

Substance	Value, 1913	Value, 1914	Increase, value	Decrease, value
Bituminous rock -----	\$78,479	\$166,618	\$88,139	-----
Brick -----	2,915,350	2,288,227	-----	\$627,123
Cement -----	7,743,024	6,558,148	-----	1,184,876
Chrome -----	12,700	9,434	-----	3,266
Lime -----	528,547	378,663	-----	149,884
Magnesite -----	77,056	114,380	37,324	-----
Marble -----	113,282	48,832	-----	64,450
Sandstone -----	27,870	45,322	17,452	-----
Stone, miscellaneous -----	6,168,020	4,860,357	-----	1,307,663
Totals -----	\$17,664,328	\$14,469,981	-----	-----
Net decrease -----	-----	-----	-----	\$3,194,347

Asphalt.

Reference: State Mineralogist Reports VII, X, XII, XIII.

Bulletins 16 and 32.

Asphalt has been usually accounted for in reports by the State Mining Bureau, because in the early days of the oil industry, considerable asphalt was produced from outcroppings of oil sand, and was a separate industry from the production of oil itself. However, at the present time most of the asphalt comes from the oil refineries, which produce a better and more even grade. There is no reason why a manufactured product should be considered in this report, which deals only with crude minerals.

Bituminous Rock.

Reference: State Mineralogist Reports XII, XIII.

Bituminous rock is used in a number of places, principally for road dressing; but the manufacture of asphalt at the oil refineries has almost eliminated the industry of mining bituminous rock. The production during 1914, from three counties, is as follows:

County	Tons	Value
San Luis Obispo -----	579	\$1,118
Santa Barbara -----	25,000	50,000
Santa Cruz -----	40,540	115,500
Totals -----	66,119	\$166,618

The following tabulation shows the total amount and value of bituminous rock quarried and sold in California since the first records were compiled by the State Mining Bureau, annually, since 1887:

Bituminous Rock.

Year	Tons	Value	Year	Tons	Value
1887 -----	36,000	\$160,000	1902 -----	33,490	\$43,411
1888 -----	50,000	257,000	1903 -----	21,944	53,106
1889 -----	40,000	170,000	1904 -----	45,280	175,680
1890 -----	40,000	170,000	1905 -----	24,753	60,436
1891 -----	39,962	154,164	1906 -----	16,077	45,204
1892 -----	24,000	72,000	1907 -----	24,122	72,835
1893 -----	32,000	192,036	1908 -----	30,718	109,818
1894 -----	31,214	115,193	1909 -----	34,123	116,436
1895 -----	38,921	121,586	1910 -----	87,547	165,711
1896 -----	49,456	122,500	1911 -----	75,125	117,279
1897 -----	45,470	128,173	1912 -----	44,073	87,467
1898 -----	46,836	137,575	1913 -----	37,541	78,479
1899 -----	40,321	116,097	1914 -----	66,119	166,618
1900 -----	25,306	71,495			
1901 -----	24,052	66,354	Totals -----	1,104,450	\$3,346,653

Brick.

Reference: Bulletin 38.

As would be expected in a state with diversified and widespread mineral resources, a great variety of brick is annually produced in California, including common, fire, pressed, glazed, sand-lime, and others. As far as possible the different kinds have been segregated in the following tabulation, but in many cases operators report their total without any classification and such figures are of necessity listed as miscellaneous. It will therefore be understood that in no case does the total of a subdivision represent the true amount if figures are also given in the miscellaneous column.

According to Bulletin No. 38, issued by the California State Mining Bureau, the following analyses show the average and the maximum and minimum of the ingredients commonly occurring in brick clays. A clay in which the percentage of any one or more of the ingredients mentioned is much above the maximum given or below the minimum will prove an inferior, if not worthless, clay for even common brick.

Chemical Analyses of Common Brick Clays.

	Average, per cent	Minimum, per cent	Maximum, per cent
Silica (SiO_2), combined-----	15.0	12.0	30.0
Silica sand -----	55.0	20.0	60.0
Alumina (Al_2O_3) -----	14.0	11.0	25.0
Water (H_2O), combined-----	4.0	3.0	9.0
Water moisture -----	2.0	0.0	6.0
Iron oxide (Fe_2O_3) -----	4.0	2.5	8.0
Lime (CaO) -----	1.5	0.5	7.0
Magnesia (MgO) -----	1.5	0.3	7.0
Alkalies (K_2O , Na_2O)-----	3.5	2.0	7.0

The detailed figures of brick production for 1913, by counties, are as follows:

Brick Production for 1914, by Counties.

County	Common		Pressed, fire, glazed		Sand-lime		Miscellaneous		Total	
	Amount, M	Value	Amount, M	Value	Amount, M	Value	Amount, M	Value	Amount, M	Value
Alameda	9,300	\$46,500	1,824	\$54,705	---	---	11,514	\$58,000	22,668	\$159,205
Amador	---	---	2,500	50,000	---	---	---	---	2,500	50,000
Contra Costa	11,000	55,000	---	---	---	---	5,064	74,543	16,064	129,543
Fresno	4,500	3,600	---	---	---	---	---	---	4,500	3,600
Humboldt	550	4,400	---	---	---	---	---	---	607	6,120
Imperial	4,900	29,400	---	---	---	---	57	1,720	4,900	29,400
Kern	2,000	14,000	---	---	---	---	---	---	3,834	29,214
Los Angeles	64,960	323,718	1,847	94,453	800	\$4,800	1,834	15,214	133,557	1,244,971
Marin	15,000	55,000	---	---	---	---	65,950	822,000	15,000	55,000
Orange	900	6,300	---	---	---	---	433	13,000	1,333	19,300
Placer	---	---	2,000	40,000	---	---	---	---	2,000	40,000
Riverside	500	3,500	1,110	33,213	---	---	---	---	1,610	36,713
Sacramento	22,362	130,923	---	---	---	---	---	---	22,862	160,923
San Bernardino	---	---	---	---	---	---	500	30,000	25	1,250
San Diego	4,510	33,925	750	6,306	---	---	25	1,250	5,457	56,392
San Joaquin	3,100	15,500	2,693	67,390	---	---	197	16,161	5,793	82,890
San Mateo	---	---	950	24,074	---	---	---	---	950	24,074
Santa Barbara	2,100	16,800	---	---	---	---	---	---	2,100	16,800
Santa Clara	15,900	79,500	---	---	---	---	---	---	15,900	79,500
Shasta	1,594	10,223	---	---	---	---	---	---	1,594	10,223
Stanislaus	250	2,500	---	---	---	---	---	---	250	2,500
Tulare	6,838	47,507	---	---	---	---	---	---	6,838	47,507
Ventura	437	2,622	---	---	---	---	12	480	449	3,102
Totals	170,701	\$880,918	13,674	\$370,141	800	\$4,800	85,616	\$1,032,368	270,791	\$2,288,227

Record of brick production in the State has been kept since 1893 by this Bureau. The annual and total figures since that date, for amount and value, are given in the following table:

Year	Thousands	Value
1893 -----	103,900	\$801,750
1894 -----	81,675	457,125
1895 -----	131,772	672,360
1896 -----	24,000	524,740
1897 -----	97,468	563,240
1898 -----	100,102	571,362
1899 -----	125,950	754,730
1900 -----	137,191	905,210
1901 -----	130,766	860,488
1902 -----	169,851	1,306,215
1903 -----	214,403	1,999,546
1904 -----	281,750	1,994,740
1905 -----	286,618	2,273,786
1906 -----	277,762	2,538,848
1907 -----	362,167	3,438,951
1908 -----	332,872	2,506,495
1909 -----	333,846	3,059,929
1910 -----	340,883	2,934,731
1911 -----	327,474	2,638,121
1912 -----	337,233	2,940,290
1913 -----	358,754	2,915,350
1914 -----	270,791	2,288,227
Totals -----	4,827,231	\$38,946,234

Cement.

Reference: State Mineralogist Reports VIII, IX, XII. Bulletin 38.

Cement is one of the most important structural materials in the output of the State. During 1914, there was produced a total of 5,109,218 bbls., valued at \$6,558,148. This production comes from six counties, as follows: Contra Costa, Napa, Riverside, San Bernardino, Santa Cruz, and Solano. There were seven plants operating, employing 2,634 men. The enlargement of this industry, of course, depends upon the growth of surrounding communities, and a summary of the lime and clay deposits of the State shows that considerable enlargement would not be impossible.

The cement industry is so centralized that it is impossible to apportion the production to the counties in which plants are located without making private business public.

"Portland" cement was first commercially produced in the State in 1891; though in 1860 and for several years following, a natural hydraulic cement from Benicia was utilized in building operations in San Francisco. While the total figures are not of the same magnitude as those for gold and petroleum, the growth of the industry has been more than rapid, and a comparison of the annual figures representing the output since the inception of the industry is of interest.

Annual production of cement in California is as follows:

Year	Barrels	Value
1891	5,000	\$15,000
1892	5,000	15,000
1893		
1894	8,000	21,600
1895	16,383	32,556
1896	9,500	28,250
1897	18,000	66,000
1898	50,000	150,000
1899	60,000	180,000
1900	52,000	121,000
1901	71,800	159,842
1902	171,000	423,600
1903	640,868	968,727
1904	969,538	1,539,807
1905	1,265,553	1,791,916
1906	1,286,000	1,941,250
1907	1,613,563	2,585,577
1908	1,629,615	2,359,692
1909	3,779,205	4,969,437
1910	5,453,193	7,485,715
1911	6,371,369	9,085,625
1912	6,198,634	6,074,661
1913	6,167,806	7,743,024
1914	5,109,218	6,558,143
Totals	40,951,245	\$54,316,427

Chrome.

Reference: State Mineralogist Reports IV, XII. Bulletin 38.

Chromic iron ore, to the extent of 1,517 short tons, valued at \$9,434, was produced during 1914.* While the material is known to exist in many places in the State, and has been mined in several other counties, including Fresno and Glenn, the present production comes entirely from Calaveras and Shasta counties, with a small amount from Tuolumne.

The European war caused some rise in the price of this material, as most of the chrome used in the United States is imported from Rhodesia and New Caledonia. Considerable effort, therefore, was expended by private parties in investigating California deposits, more particularly with the idea of expecting to find large quantities which would justify entering the market and making long-time contracts, in competition with the foreign deposits. Most of these investigations were without success, as the California deposits are in most cases, not beyond the prospective stage.

There is no reason why the industry should not see a considerable growth, however, in the future.

*These figures are from signed returns of the actual producers, which we have verified and find correct, though at variance with the data available to the U. S. Geological Survey as indicated in their Mineral Resources, 1913.

The annual output of chromite since 1887 is as follows:

Year	Tons	Value
1887	3,000	\$40,000
1888	1,500	20,000
1889	2,000	30,000
1890	3,599	53,985
1891	1,372	20,580
1892	1,500	22,500
1893	3,319	49,785
1894	3,680	39,980
1895	1,740	16,795
1896	786	7,775
1897		
1898		
1899		
1900	140	1,400
1901	130	1,950
1902	315	4,725
1903	150	2,250
1904	123	1,845
1905	40	600
1906	317	2,859
1907	302	6,040
1908	350	6,195
1909	436	5,309
1910	749	9,707
1911	935	14,197
1912	1,270	11,260
1913	1,180	12,700
1914	1,517	9,434
Totals	30,450	\$391,971

Lime.

Reference: Bulletin 38.

Lime to the amount of 439,961 bbls., valued at \$378,663, was produced from ten counties during 1914. This is a decrease from the previous year, both in amount and value.

Distribution by counties is shown in the following table:

County	Barrels	Value
Amador	1,540	\$2,008
Contra Costa	5,666	4,724
El Dorado	14,000	12,082
Kern	81,600	65,100
San Bernardino	84,637	93,100
San Mateo	6,571	*845
Santa Cruz	173,282	157,011
Shasta	8,657	5,164
Siskiyou	677	629
Tuolumne	63,331	38,000
Totals	439,961	\$378,663

*Lime dust.

Magnesite.

Reference: State Mineralogist Reports XII, XIII. Bulletin 38. U. S. G. S. Bulletins, 355, 540.

Magnesite has for a number of years been known to exist in many localities in California. In quality it is very high grade, many deposits yielding material carrying about 95% magnesium carbonate. The deposits are mostly in the metamorphic rocks of the Coast Range and Sierra Nevada Mountains, and are scattered over an area nearly four hundred miles long. One deposit of sedimentary origin is situated in the Mojave Desert region.

During the year 1914 there was considerable activity in the production of magnesite, giving a larger output than during any previous year except 1910. Doubtless the curtailing of some European supplies, due to the war, and the added possibilities for transportation through the Panama Canal, to eastern markets, have led to the increased production. The permanent nature of improvements at some deposits gives promise that future production will be still greater.

The following concerns are among those producing in 1914:

Cedar Mountain Magnesite Mine, Alameda County, where the rock was mined by the glory-hole system, and calcined in a flat hearth furnace, using oil fuel and having a daily capacity of about ten tons of crude.

The Sherlock Mine, Santa Clara County, quarries the rock and ships it in the crude state. At the Red Mountain deposit, the material is stoped underground, calcined in a vertical shaft kiln, and transported 33 miles by auto trucks to the railroad.

The Sonoma Magnesite Company, Sonoma County, is installing rotary kilns and a short railroad for delivery to the main line.

The Tulare Mining Company, Tulare County, stopes the magnesite exposed in underground workings, and calcines the product.

A number of owners have carried on development work, and it seems assured that a much greater demand can easily be met by the various California deposits.

The principal uses at the present time include: refractory linings for basic open-hearth steel furnaces, copper reverberatories and converters, bullion and other metallurgical furnaces; in the manufacture of paper from wood pulp; and in structural work, for flooring, wainscoting, tiling, sanitary kitchen and hospital finishing, etc. In connection with building work it has proven particularly efficient as a flooring for steel railroad coaches, on account of having greater elasticity and resilience than "Portland" cement. For refractory purposes, the magnesite is "dead-burned"—*i. e.*, all or practically all of the CO_2 is expelled from it. For cement purposes, it is left "caustic"—*i. e.*, from 5% to 10% of CO_2 is retained. When dry caustic magnesite is mixed with a solution of magnesium chloride (MgCl_2)

in proper proportions, a very strong cement is produced, known as oxychloride or Sorel cement.* "It is applied in a plastic form, * * * which sets in a few hours as a tough, seamless surface. It has also a very strong bonding power, and will hold firmly to wood, metal, or concrete as a base. It may be finished with a very smooth even surface, which will take a good wax or oil polish. As ordinarily mixed there is added a certain proportion of wood flour, cork, asbestos, or other filler, thereby adding to the elastic properties of the finished product." Its surface is described as "warm" and "quiet" as a result of the elastic and nonconducting character of the composite material. The cement is usually colored by the addition of some mineral pigment to the materials before mixing as cement.

The desirable qualities of any flooring material (cost not considered) are listed for purposes of analysis or comparison under eighteen heads, as follows: Cleanliness (sanitary qualities), quietness, immunity from abrasion (surface wear), resilience, immunity from slipperiness, appearance, waterproof character, plasticity, warmth (thermal insulation), life (immunity from deterioration with age), acid-proof character, alkali-proof character, fire resistance, elasticity, crushing strength, structural strength (rupture), immunity from expansion and contraction, and lightness. The importance of these several qualities varies with the varying requirements to be met; for instance, in some places, as in hospitals, cleanliness is one of the prime considerations; in other places immunity from abrasion might be one of the principal requisites. As to most of these qualities the conclusion is reached that the magnesia cement affords one of the most satisfactory flooring materials for many purposes such as in kitchen, laundry, toilet, and bathrooms, corridors, large rooms or halls in public or other buildings, including hospitals, factories, shops and restaurants.

There is no doubt that the material is steadily coming into more general recognition and favor for these uses. For a few special uses it is more or less disqualified; as an instance, it is not suited for construction of swimming tanks or for conditions of permanent wetness, since under constant immersion it gradually softens, although it is said to withstand intermittent wetting and drying and is recommended for shower baths. Naturally it is not acid-proof and not wholly alkali-proof, which might be a disadvantage in use for laboratory floors and tables; but these are rather special requirements. Its cost per square foot is given as 25 to 33 cents, depending on area, which is estimated to be lower than marble, cork, rubber, clay or

*In this summary of the uses and properties of magnesia cement we have drawn freely from the following references:

Eng. Soc. Western Pennsylvania Proc., 1913, vol. 29, pp. 305-338, 418-444;
U. S. G. S., Mineral Resources, 1913, Part II, pp. 450-453.

mosaic tile, slate, or terrazzo, although more expensive than wood, asphalt, linoleum, or Portland cement.

In the discussion of the subject the causes of failure are ascribed to uncertain climatic changes, lack of uniformity in the mixtures used, lack of care on the part of those handling the materials, possible deterioration of materials used through exposure (either before or after mixing), lack of proper preparation of foundations on which the material is to be laid, and, as a very important factor, experience or nonexperience in the manipulation or actual laying and troweling of the material. Data concerning the percentages of magnesium chloride and of ground calcined magnesia and data concerning the character and quantity of filler and color added to the commercial preparations are naturally guarded as trade secrets by the firms already in the business. The examination and standardization of the raw materials used, and of acceptable filler materials, and the establishment of standard proportions for the mixtures would seem to be about the only satisfactory way of attacking the problem.

The condition of the calcination of magnesite for cement uses is important, as the same material may undoubtedly be very greatly varied in its reacting properties by differing treatment in the kiln. It is generally agreed that the magnesite for cement use must be comparatively free from lime, as lime has a greater tendency to reabsorb water and carbon dioxide than the magnesia, thereby causing swelling, and is therefore not so permanent in the completed cement as a pure magnesia material. The fillers used may constitute 10% to 40% of the whole cement, and commonly consist of ground marble, sand, sawdust, cork, asbestos, or other materials. As an example of the formulas used in mixing such cements the following are quoted:*

Mixtures for the underlying or coarser layer.

[Parts by weight.]

1. 15 parts magnesia.
10 parts magnesium chloride solution, 20° Baumé.
10 parts moist sawdust.
(Sets in 36 hours.)
2. 10 parts magnesia.
10 parts magnesium chloride solution, 28° Baumé.
5 parts sawdust.
(Sets in 16 hours.)
3. 20 parts magnesia.
15 parts magnesium chloride solution, 20° Baumé.
4 parts ground cork.
(Sets in 24 hours.)
4. 5 parts magnesia.
3 parts magnesium chloride solution, 20° Baumé.
5 parts ashes.
(Sets in 24 hours.)

*Scherer, Robert, *Der Magnesit, sein Vorkommen, seine Gewinnung und technische Verwertung*, pp. 216-217, A. Hartleben's Bibliothek, Wien und Leipzig 1908.

Mixtures for overlying or surface layers.

[Parts by weight.]

1. 40 parts magnesia.
33 parts magnesium chloride solution, 19° Baumé.
10 parts asbestos powder.
5 parts wood flour.
1 part red ochre.
(Sets in 24 hours.)
2. 25 parts magnesia.
25 parts magnesium chloride, 21° Baumé.
4½ parts wood flour, impregnated with 4½ parts Terpentinarztlösung.
15 parts yellow ochre.
(Sets in 30 hours.)

The magnesite used is, as explained, the fine ground calcined (not dead-burned) of certain specified kinds or place of derivation regularly sold for the plastic purposes. This material commonly comes in paper-lined casks, barrels, or boxes, in which form it is fairly permanent, but it deteriorates by exposure, absorbing carbonic acid and moisture from the air. If carefully handled it can probably be kept unopened a year or more, but it should be used within a few weeks after being opened, even under most favorable conditions.

In considering mineral production the value of the crude material is used as far as practicable. Magnesite presents a peculiar example of a material which is seldom handled on the market in the crude state. It is calcined and ground before being considered marketable. The value of the calcined magnesite varies, the San Francisco price for 1914 averaging \$25 to \$30 per ton, which figure includes about \$4 per ton freight. From two to two and one-half tons of the crude material are mined to make one ton of the calcined. From this derivation we have arbitrarily figured the value of the crude production, for 1914, on a basis of \$10 per ton at the mine.

Magnesite products have been found to be highly satisfactory and are growing in popularity, and the future for this industry appears to be bright. A large supply is already known to exist in California, and only a sufficient demand and cheaper transportation are lacking to make this an item of consequence in the mineral total of the State.

Production for 1914, by county, is given in the following table, with total crude value, figured according to the foregoing assumption. In addition to this, a considerable tonnage was reported as having been mined at certain properties, but not marketed before the end of the year, hence not entered here:

County	Tons	Value
Alameda -----	150	\$1,500
Santa Clara -----	1,425	14,250
Sonoma -----	213	2,130
Tulare -----	9,650	96,500
Totals -----	11,438	\$114,380

Annual production for California, amount and value, since 1887, is shown in the following tabulation:

Year	Tons	Value
1887 -----	600	\$9,000
1888 -----	600	9,000
1889 -----	600	9,000
1890 -----	600	9,000
1891 -----	1,500	15,000
1892 -----	1,500	15,000
1893 -----	1,093	10,930
1894 -----	1,440	10,240
1895 -----	2,200	17,000
1896 -----	1,500	11,000
1897 -----	1,143	13,671
1898 -----	1,263	19,075
1899 -----	1,280	18,480
1900 -----	2,252	19,333
1901 -----	4,726	43,057
1902 -----	2,830	20,655
1903 -----	1,361	20,515
1904 -----	2,850	9,298
1905 -----	3,933	16,221
1906 -----	4,032	40,320
1907 -----	6,405	57,720
1908 -----	10,582	80,822
1909 -----	7,942	62,588
1910 -----	16,570	113,887
1911 -----	8,858	67,430
1912 -----	10,512	105,120
1913 -----	9,632	77,056
1914 -----	11,438	114,380
Totals -----	119,242	\$1,014,798

Marble.

Reference: State Mineralogist Report XII. Bulletin 38.

Marble is widely distributed in California. During 1914, the production by counties was as follows:

County	Cubic feet	Value
Inyo -----	3,500	\$10,500
Mariposa -----	100	100
Tulare -----	6	30
Tuolumne -----	21,830	38,202
Totals -----	25,436	\$48,832

In 1913, 41,654 cubic feet were sold, having a spot value of \$113,282. The decrease from the previous year is doubtless a reflection of the laxity in building operations, which is shown by some of the other structural materials.

Data on annual production since 1887, as compiled by the State Mining Bureau, follows. Previous to 1894 no records of amount were preserved:

Year	Cubic feet	Value
1887		\$5,000
1888		5,000
1889		87,030
1890		80,000
1891		100,000
1892		115,000
1893		40,000
1894	38,441	98,326
1895	14,864	56,566
1896	7,889	32,415
1897	4,102	7,280
1898	8,050	23,594
1899	9,682	10,550
1900	4,103	5,891
1901	2,945	4,630
1902	19,305	37,616
1903	84,624	97,354
1904	55,401	94,208
1905	73,303	129,450
1906	31,400	75,800
1907	37,512	118,066
1908	18,653	47,665
1909	79,600	238,400
1910	18,960	50,200
1911	20,201	54,103
1912	27,820	74,120
1913	41,654	113,282
1914	25,436	48,832
Total value		\$1,850,378

Onyx and Travertine.

Reference: State Mineralogist Report XII. Bulletin 38.

Onyx and travertine are known to exist in a number of places in California, but there has been no production reported since the year 1896.

Production by years is as follows:

Year	Value
1887 -----	\$900
1888 -----	900
1889 -----	900
1890 -----	1,500
1891 -----	2,400
1892 -----	1,800
1893 -----	27,000
1894 -----	20,000
1895 -----	12,000
1896 -----	24,000
Total -----	\$91,400

Sandstone.

Reference: State Mineralogist Report XII. Bulletin 38.

An unlimited amount of high grade sandstone is available in California, but the wide use of concrete in buildings of every character, as well as the popularity of a lighter colored building stone, has retarded this branch of the mineral industry very seriously during recent years. In 1914 six counties turned out 111,691 cubic feet, valued at \$45,322, which is a considerable advance over the previous year. Production by counties is as follows:

County	Cubic feet	Value
Amador -----	3,960	\$1,500
Colusa -----	16,000	7,300
San Mateo -----	81,000	34,020
Santa Barbara -----	9,286	*1,850
Siskiyou -----	250	150
Ventura -----	1,195	502
Totals -----	111,691	\$45,322

*Includes 5,000 cubic feet conglomerate.

Amount and value, as far as contained in the records of this Bureau, are presented herewith, with total value from 1887 to date:

Year	Cubic feet	Value
1887		\$175,000
1888		150,000
1889		175,598
1890		100,000
1891		100,000
1892		50,000
1893		26,314
1894		113,592
1895		35,373
1896		28,379
1897		24,086
1898		46,384
1899	56,264	103,384
1900	378,468	254,140
1901	266,741	192,132
1902	212,123	142,506
1903	353,002	585,309
1904	363,487	567,181
1905	302,813	483,268
1906	182,076	164,063
1907	159,573	148,148
1908	93,301	55,151
1909	79,240	37,032
1910	165,971	80,443
1911	255,313	127,314
1912	66,487	22,574
1913	62,227	27,870
1914	111,691	45,322
Total value		\$4,060,568

Serpentine.*Reference:* Bulletin 38.

Serpentine has not been produced in California at any time, to a very large extent, owing to defects in the stone, most of which is not of good texture.

The following table shows the amount and value of serpentine since 1895 as recorded by this Bureau:

Year	Cubic feet	Value
1895	4,000	\$4,000
1896	1,500	6,000
1897	2,500	2,500
1898	750	3,000
1899	500	2,000
1900	350	2,000
1901	89	890
1902	512	5,065
1903	99	800
1904	200	2,310
1906	847	1,694
1907	1,000	3,000
Totals	12,347	\$33,259

Slate.

Reference: Bulletin 38.

Slate was first produced in California in 1889. Up to and including 1910 such production was continuous. Many large deposits are known in the State, especially in El Dorado and Mariposa counties, but the demand is not what it was a few years past.

A complete record of amount and value of slate produced in California follows:

Year	Squares	Value
1889	4,500	\$18,089
1890	4,000	24,000
1891	4,000	24,000
1892	3,500	21,000
1893	3,000	21,000
1894	1,800	11,700
1895	1,350	9,450
1896	500	2,500
1897	400	2,800
1898	400	2,800
1899	810	5,900
1900	3,500	26,250
1901	5,100	38,250
1902	4,000	30,000
1903	10,000	70,000
1904	6,000	50,000
1905	4,000	40,000
1906	10,000	100,000
1907	7,000	60,000
1908	6,000	60,000
1909	6,961	45,660
1910	1,000	8,000
Totals	87,821	\$671,399

Miscellaneous Stone.

Reference: State Mineralogist Report XII. Bulletin 38.

Miscellaneous stone is the name used throughout this report as the title for that branch of the mineral industry covering crushed rock of all kinds, granite, paving blocks and sand and gravel. The foregoing are very closely related from the standpoint of the producer. The quarry which produces granite blocks this year may have a commercial output of crushed rock next, or its product may regularly consist of both classes of material. Thus it has been found to be most satisfactory to group these items as has been done in recent reports of this Bureau. In so far as it has been possible to do so, granite and crushed rock production has been subdivided into the various uses to which the product was put. It will be noted, however, that in both instances a very large percentage of the output has been tabulated under the heading "Unclassified." This is necessary because of the fact that

many of the producers have no way of telling to what specific use their rock was put after they have quarried and sold the same.

Stone, as well as some other structural materials, shows a decrease for 1914. The total production was valued at \$4,860,357, at the properties.

As has been the case for several years past, Los Angeles County led all others by a wide margin, with an output valued at \$953,434; Marin second, with \$490,137; Alameda third, with \$381,135; and Contra Costa fourth, with \$308,727.

Granite Production, by Counties, for 1914.

County	Building stone		Monumental		Curbing		Unclassified	
	Cubic feet	Value	Cubic feet	Value	Cubic feet	Value	Cubic feet	Value
Fresno -----	600	\$750	9,600	\$20,500	-----	-----	-----	-----
Humboldt -----	-----	-----	50	50	-----	-----	113,975	\$182,000
Lassen -----	3,200	400	-----	-----	-----	-----	-----	-----
Madera -----	244,500	178,650	10,030	7,471	603	\$422	-----	-----
Napa -----	-----	-----	-----	-----	-----	-----	*40,000	3,500
Nevada -----	-----	-----	500	1,428	250	600	-----	-----
Placer -----	11,240	14,950	12,842	18,023	45,962	25,175	75,000	100,000
Plumas -----	588	500	15	150	100	50	122,400	979
Riverside -----	35,675	11,934	2,803	2,415	10,210	6,062	5,000	3,700
Sacramento -----	28,000	37,500	-----	-----	-----	-----	-----	-----
San Bernardino -----	-----	-----	-----	-----	2,500	250	-----	-----
San Diego -----	125	125	5,300	6,300	-----	-----	-----	-----
Santa Barbara -----	14,117	1,800	-----	-----	-----	-----	-----	-----
Sonoma -----	706	780	-----	-----	15,200	572	-----	-----
Tulare -----	-----	-----	1,000	750	-----	-----	2,000	1,000
Totals -----	338,751	\$247,389	42,140	\$57,087	64,825	\$33,131	358,375	\$291,179

*Tuff.

†Basalt.

‡Decomposed.

Paving Block Production, by Counties, for 1914.

County	M	Value
Placer -----	285	\$9,000
Riverside -----	653	34,386
Sacramento -----	60	1,800
San Bernardino -----	300	15,000
San Diego -----	650	37,129
Solano -----	106	4,778
Sonoma -----	3,999	168,505
Totals -----	6,053	\$270,598

Sand and Gravel Production, by Counties, for 1914.

County	Tons	Value
Alameda -----	599,926*	\$241,619
Butte -----	99,811	11,280
Contra Costa -----	45,842	9,695
Del Norte -----	500	250
El Dorado -----	1,000	500
Fresno -----	52,141	26,071
Glenn -----	458,304	30,553
Humboldt -----	9,500	10,840
Lassen -----	300	325
Los Angeles -----	1,484,707	400,270
Madera -----	1,800	400
Marin -----	300	100
Mendocino -----	800	560
Monterey -----	98,037	36,517
Napa -----	153,935	97,818
Nevada -----	400	80
Orange -----	72,707	18,315
Placer -----	30,000	9,000
Riverside -----	14,810	5,996
Sacramento -----	321,473	36,685
San Bernardino -----	84,799	35,215
San Diego -----	186,127	70,851
San Francisco -----	33,270	6,654
San Joaquin -----	38,880	19,440
San Mateo -----	21,318	6,893
Santa Barbara -----	10,500	3,500
Santa Clara -----	40,230	19,957
Shasta -----	250	125
Siskiyou -----	53,713	5,371
Sonoma -----	114,785	37,972
Stanislaus -----	65,031	3,096
Yuba -----	81,693	14,895
Totals -----	4,176,889	\$1,160,837

*Includes moulding sand.

Crushed Rock Production, by Counties, for 1914.

County	Macadam		Rubble		Concrete		Unclassified	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value
Alameda	42,196	\$27,617	1,663	\$2,055	61,615	\$33,222	130,267	\$76,622
Butte	17,375	9,974			43,312	29,183	833	458
Contra Costa	1,200	60	9,977	5,480	34,275	34,275	442,182	259,217
Del Norte	2,000	3,000						
El Dorado	2,000	2,000						
Fresno	154,560	77,280						
Humboldt								
Lassen			1,035	1,237	100	100		
Los Angeles	166,823	126,745			76,520	43,812	169,000	69,550
Madera			2,284	1,142	60	60	4,636	14,017
Marin			23,284	5,821	50	50		
Mariposa	168,111	44,000	731,473	365,737	65,790	52,631	591,252	372,646
Monterey								
Napa	3,500	2,100	400	240	10,600	5,300	150,000	75,000
Orange	27,752	27,448	1,050	1,550	75	45	34,550	15,366
Placer							500	300
Plumas			40,397	14,725	200,000	70,000		
Riverside	16,500	14,710	28,800	200			38,500	12,720
Sacramento	86,990	52,395		11,520	16,393	14,894	159,393	101,191
San Benito	190,000	76,000			176,874	94,258	68,990	30,596
San Bernardino	20,000	6,666			41,576	16,630	45,000	18,000
San Diego			140,299	63,853	15,000	9,750	922	1,244
San Francisco	18,638	6,739	1,236	1,017	107,734	92,745	7,352	2,083
San Mateo	19,257	14,010	63,338	50,913	79,727	54,037	1,904	1,546
Santa Barbara	6,000	10,000	941	905	16,533	12,718	632	122
Santa Clara	28,765	19,039						
Santa Cruz	1,399	910						
Solano					108	97		
Sonoma	36,675	26,893	364	235	3,740	3,365	97,009	66,510
Totals	1,009,741	\$547,586	1,046,621	\$526,630	951,070	\$568,143	2,014,076	\$1,157,777

Total value of production of "Miscellaneous Stone" by counties, for 1914 and 1913, with increase or decrease in each instance:

County	1914	1913	Decrease	Increase
Alameda	\$381,135	\$456,064	\$74,929	
Amador		670	670	
Butte	50,895	258,503	207,608	
Contra Costa	308,727	660,405	351,678	
Del Norte	3,250			\$3,250
El Dorado	2,600	4,678	2,078	
Fresno	237,963	416,437	178,474	
Glenn	30,553	27,776		2,777
Humboldt	208,204	439,808	231,604	
Imperial		12,000	12,000	
Inyo		835	835	
Lassen	775	2,030	1,255	
Los Angeles	953,434	1,008,810	55,376	
Madera	192,764	271,589	78,825	
Marin	490,137	198,953		291,184
Mariposa	15,366			15,366
Mendocino	560	9,450	8,890	
Merced		30,000	30,000	
Monterey	39,202	12,556		26,646
Napa	130,316	243,759	113,443	
Nevada	2,108	5,000	2,892	
Orange	88,315	36,815		51,500
Placer	203,593	205,749	2,156	
Plumas	1,879	1,700		179
Riverside	206,802	536,844	330,042	
Sacramento	253,235	238,476		14,758
San Benito	110,630	119,500	8,870	
San Bernardino	131,978	364,312	232,334	
San Diego	210,250	170,014		40,236
San Francisco	119,889	110,551		9,338
San Joaquin	19,440	900		18,540
San Luis Obispo		134		134
San Mateo	34,648	18,635		16,013
Santa Barbara	15,300	11,450		3,850
Santa Clara	39,093	29,377		9,716
Santa Cruz	4,276	10,511	6,235	
Shasta	125			125
Siskiyou	5,371	4,883		488
Solano	71,288	28,915		42,373
Sonoma	276,516	191,436		85,080
Stanislaus	3,096	14,482	11,386	
Tehama		600	600	
Trinity		1,000	1,000	
Tulare	1,750	4,350	2,600	
Yuba	14,895	8,063		6,832
Totals	\$4,860,357	\$6,168,020		
Net decrease			\$1,307,663	

CHAPTER FIVE.

INDUSTRIAL MATERIALS.

The following mineral substances have been arbitrarily arranged under the general heading of "Industrial Materials," as distinguished from those which have a clearly defined classification, such as metals, salines, structural materials, etc.

These materials, many of which are mineral earths, are produced on a comparatively small scale at the present time. Almost without exception the possibilities of development along these lines are practically unlimited; and with increasing transportation, and other facilities, together with a steadily growing demand, the future for this branch of the mineral industry in California is indeed bright. There is scarcely a county in the State but might contribute to the output.

To date, production has been in the majority of instances dependent upon more or less of a strictly local market, and the following data will show the results of such a condition, not only in the widely varying amounts of a certain material produced from year to year, but in widely varying prices of the same material, often, in different sections of the State. Furthermore, the quality of this general class of material will be found to fluctuate, even in the same deposit, especially as regards price.

The following summary shows the value of the industrial materials produced in California during the years 1913-1914, with increase or decrease in each instance:

Substance	1913	1914	Increase	Decrease
Asbestos -----	\$1,175	\$1,530	\$355	-----
Barytes -----	3,680	3,000	-----	\$680
Clay -----	261,273	167,552	-----	93,721
Feldspar -----	7,850	16,565	8,715	-----
Fuller's earth -----	3,700	5,928	2,228	-----
Gems -----	13,740	3,970	-----	9,770
Graphite -----	25	-----	-----	25
Gypsum -----	135,050	78,375	-----	56,675
Infusorial earth -----	35,968	80,350	44,382	-----
Limestone -----	274,455	517,713	243,258	-----
Manganese -----	-----	1,500	1,500	-----
Mineral paint -----	1,780	847	-----	933
Mineral water -----	599,748	476,169	-----	123,579
Pumice -----	4,500	1,000	-----	3,500
Pyrites -----	218,537	230,058	11,521	-----
Quartz rock -----	7,756	4,800	-----	2,956
Sand, glass -----	14,143	17,888	3,745	-----
Soapstone -----	6,150	4,500	-----	1,650
Totals -----	\$1,589,590	\$1,611,745	-----	-----
Net increase -----	-----	-----	\$22,215	-----

Asbestos.

Reference: State Mineralogist Reports XII, XIII. Bulletin 38.

Though asbestos of various grades is known to exist widely distributed in California, the production for the year 1914 was but 51 tons, valued at \$1,530, the combined result of several small shipments from a number of localities, including Shasta, Trinity, Placer, Calaveras, Alameda, and El Dorado counties. One firm has established a grinding and fiberizing plant in Oakland, and is now manufacturing a series of products in which both asbestos and magnesite play a part. These include steam pipe covering, composition flooring, and plaster for stucco work. The outlook is for a decided increase in the output of these materials during the coming year.

The real history of the development and use of asbestos dates back only about sixty years. Since that time the investigation as to its occurrence, uses, and methods of treatment has been continuous, and its application to everyday life has grown with wonderful rapidity. The first mill built to handle the crude ore and extract the fibre on a large scale by machinery was constructed in 1888.

The first production of asbestos in California was in 1887, when 30 tons were mined, having a crude value of \$60 per ton, according to the State Mining Bureau reports.

The bulk of the world's supply of this mineral today comes from Canada; and Canadian asbestos, so far, leads in quality as well as in quantity.

The word "asbestos" (derived from the Greek meaning incombustible) as used here includes several minerals, from a strictly mineralogical standpoint. There are two main divisions, however: amphibole and chrysotile. The fibrous varieties of several of the amphiboles (silicates chiefly of lime, magnesia and iron), notably tremolite and actinolite, are called asbestos. Their fibres usually lie parallel to the fissures containing them. Amphibole asbestos possesses high refractory properties, but lacks strength of fibre, and is used principally for covering steam pipes and boilers. Chrysotile, a hydrous silicate of magnesia, is a fibrous form of serpentine, and often of silky fineness. Its fibres are formed at right angles to the direction of the fissures containing them. Chrysotile fibres, though short, have considerable strength and elasticity, and may be spun into threads and woven into cloth.

To bring the highest market price asbestos must needs have a combination of properties, *i. e.*, length and fineness of fibre, tensile strength and flexibility—all combined with infusibility. Of these qualities the most important are toughness and infusibility, and determination of the same can only be made by practical tests or in the laboratory. Given several specimens of the same tensile strength and degree of

infusibility, the one having the longest fibre will, of course, be of the greatest value. It must be kept in mind, however, that length of fibre alone, the characteristic which most naturally appeals to the eye, is not the final test in regard to the commercial value of the find; and much short fibre asbestos, which on first appearance is of inferior grade, is being sold and profitably handled at the present time.

The largest Canadian asbestos deposits are worked as open quarries where the ore is roughly sorted before being sent to the mill to be dressed for the market. This method has been found to be cheaper and more satisfactory in every way.

The milling of asbestos ore, while more or less complicated in actual practice, is easy to understand and has one well-defined object in view: That is, the complete eradication of all foreign rock ingredients and the thorough cleaning and separation of the fibres.

Asbestos, roughly speaking, is worth from \$20 to \$200 per ton. The poorer grades which are unsuitable for weaving, and which, of course, command the lower prices, are used in the manufacture of steam packing, furnace linings, asbestos brick, wall plasters, paints, tilings, asbestos board, insulating material, etc. The better grades are utilized in the manufacture of tapestries of various kinds, fireproof theater curtains, cloth, rope, etc.

A very important development of the asbestos industry is the rapidly increasing demand for the lower grade material, on account of the numerous diversified uses to which asbestos products are being put, in almost every branch of manufacture. This fact means that many deposits of asbestos will become commercially important even though the grade of the material is far from the best.

It has been discovered only recently that not only does an asbestos wall plaster render the wall so covered impervious to heat, but that in rooms which have given forth an undesirable echo this evil has been absolutely removed. Asbestos pulp mixed with cement and magnesite has been experimented with in the East; and roofing, flooring, and other building material of the most satisfactory sort has been manufactured therefrom.

The value of the domestic production of asbestos has averaged around \$43,000 annually, the past ten years, except 1911, which was approximately \$120,000. The imports, largely from Canada, for 1913 amounted to \$1,928,705, according to U. S. G. S. Mineral Resources, 1913. This value is for crude material; adding the imported manufactured asbestos articles the figure amounts to \$2,318,369.

With the field for development along these lines which is open in California, it seems almost certain that some time in the future will see this branch of the mineral industry adding its share to the total of the wealth and productiveness of this State.

Total amount and value of asbestos production in California since 1887, as given in the records of this Bureau, are as follows:

Year	Tons	Value
1887	30	\$1,800
1888	30	1,800
1889	30	1,800
1890	71	4,260
1891	66	3,960
1892	30	1,830
1893	50	2,500
1894	50	2,250
1895	25	1,000
1896		
1897		
1898	10	200
1899	30	750
1900	50	1,250
1901	110	4,400
1902		
1903		
1904	10	162
1905	112	2,625
1906	70	3,500
1907	70	3,500
1908	70	6,100
1909	65	6,500
1910	200	20,000
1911	125	500
1912	90	2,700
1913	47	1,175
1914	51	1,530
Totals	1,492	\$76,092

Barytes.

Reference: State Mineralogist Report XII. Bulletin 38.

The output of crude barytes during 1914 was 2,000 tons, valued at \$3,000, as compared with the 1913 production of 1,600 tons, worth \$3,680. This indicates a spot value of only \$1.50 per ton for the 1914 product. As a matter of fact barytes is ordinarily sorted and ground before being put on the market, and in this prepared condition brings approximately \$10 to \$14 per ton. The principal use of this material is in the paint industry. Minor uses are in tanning of leather, manufacture of paper and rope, and sugar refining. A grinding and chemical plant has recently begun operations at Melrose, Alameda County, making a specialty of barium compounds.

Known occurrences of this mineral in California are located in Butte, Mariposa, San Bernardino, Shasta, Calaveras, Inyo, and Nevada counties. The deposit at El Portal, in Mariposa County, has given the largest commercial production to date.

Bauxite.

Reference: Bulletin 38.

No deposits of pure bauxite have been discovered in the State, although from time to time small quantities of the impure material have been the foundation of extravagant reports regarding such discoveries. In 1912 a company was incorporated and work of developing such a deposit was outlined, but close investigation proved the futility of such effort.

According to Bulletin 67 of this Bureau, bauxite of uncertain quality has been found at Smartsville, Yuba County.

Clay.

Reference: State Mineralogist Reports I, IV, IX, XII. Bulletin 38.

At one time or another in the history of the State, pottery clay has been quarried in thirty-three of its counties. In this report "pottery clay" refers to all clays used in the manufacture of red and brown earthenware, flower pots, tiling of all descriptions, architectural terra cotta, sewer pipe, etc., and the figures for amount and value are relative to the crude material at the pit, without reference to whether the clay was sold in the crude form, or whether it was immediately used in the manufacture of any of the above finished products by the producer.

During 1914 producers in seven counties reported an output of 179,948 tons of clay, having a spot value of \$167,552 for the crude material, as compared with the 1913 production of 231,179 tons worth \$261,273.

A tabulation of the direct returns from the producers, by counties, for the year 1914 is shown herewith:

County	Tons	Value
Alameda -----	5,000	\$1,000
Amador -----	32,223	33,114
Calaveras -----	280	280
Kern -----	346	172
Los Angeles -----	8,263	14,566
Placer -----	63,700	49,000
Riverside -----	70,136	69,420
Totals -----	179,948	\$167,552

Amount and value of clay output in California since 1887, are given in the following table:

Year	Tons	Value
1887 -----	75,000	\$37,500
1888 -----	75,000	37,500
1889 -----	75,000	37,500
1890 -----	100,000	50,000
1891 -----	100,000	50,000
1892 -----	100,000	50,000
1893 -----	24,856	67,284
1894 -----	28,475	35,073
1895 -----	37,660	39,685
1896 -----	41,907	62,900
1897 -----	24,592	30,290
1898 -----	28,947	33,747
1899 -----	40,600	42,700
1900 -----	59,636	60,956
1901 -----	55,679	39,144
1902 -----	67,933	74,163
1903 -----	90,972	99,907
1904 -----	84,149	81,952
1905 -----	133,805	130,146
1906 -----	167,267	162,283
1907 -----	160,385	254,454
1908 -----	208,042	325,147
1909 -----	299,424	465,647
1910 -----	249,028	324,099
1911 -----	224,576	252,759
1912 -----	199,605	215,683
1913 -----	231,179	261,273
1914 -----	179,948	167,552
Totals -----	3,163,665	\$3,489,344

Feldspar.

Reference: Bulletin 67.

Feldspar was produced in Monterey and Tulare counties during 1914, to the total amount of 3,530 tons, valued at \$16,565. Feldspar production only dates back to 1910 in this State; the mineral is a constituent of many rocks, but can only be commercially produced from pegmatites where the crystals are large and quite free from impurities. The open cut method of mining this material is commonly used. Manufacturers of enamel wares and pottery buy most of the better grades of feldspar produced. Small quantities are used in the manufacture of glass and scouring soaps, and the more impure material is utilized as "chicken grit," in making various brands of roofing, and in other ways. Various experiments have been made with the potash feldspars in the attempt to prove their value as a fertilizer, with more or less negative results.

Total amount and value of feldspar production in California since the inception of the industry are given in the following table, by years:

Year	Tons	Value
1910 -----	760	\$5,720
1911 -----	740	4,560
1912 -----	1,382	6,180
1913 -----	2,129	7,850
1914 -----	3,530	16,565
Totals -----	8,541	\$40,875

Fuller's earth.

Reference: Bulletin 38.

Fuller's earth production in California during the year 1914 amounted to 760 tons, valued at \$5,928, as compared with 460 tons worth \$3,700 in 1913.

This material is soft and friable, and, in general, resembles a clay. It has no definite mineralogical composition, and its commercial value is determined by its physical properties, *i. e.*, texture, and filtering and absorbent properties.

In California fuller's earth is used principally in clarifying refined mineral oils, although its first use was in fulling wool, as the name indicates. During 1914 the production by counties was as follows:

County	Tons	Value
Calaveras -----	290	\$2,618
Kings -----	20	160
Monterey -----	450	3,150
Totals -----	760	\$5,928

It was first discovered in this State in 1899, and the total amount and value of the production since that time are as follows:

Year	Tons	Value
1899 -----	620	\$12,400
1900 -----	500	3,750
1901 -----	1,000	19,500
1902 -----	987	19,246
1903 -----	250	4,750
1904 -----	500	9,500
1905 -----	1,344	38,000
1906 -----	440	10,500
1907 -----	100	1,000
1908 -----	50	1,000
1909 -----	459	7,385
1910 -----	340	3,820
1911 -----	466	5,294
1912 -----	876	6,500
1913 -----	460	3,700
1914 -----	760	5,928
Totals -----	9,152	\$152,273

Gems.

Reference: Bulletins 37, 64, 67. State Mineralogist Report II.

Accounting for the production of gems in California is very unsatisfactory, owing to the widely scattered places at which stones are gathered and marketed in a very small way. The following table shows the production by counties during 1914:

County	Value	Kind
Butte -----	\$100	Diamonds.
Los Angeles -----	2,100	Beach stones.
Nevada -----	60	Diamond.
San Diego -----	1,510	Hyacinth, beryl, topaz, tourmaline, kunzite.
San Mateo -----	200	Beach stones.
Total -----	\$3,970	

The value of the total gem production in California annually since the beginning of commercial production is as follows:

Year	Value
1900 -----	\$20,500
1901 -----	40,000
1902 -----	162,100
1903 -----	110,500
1904 -----	136,000
1905 -----	148,500
1906 -----	497,090
1907 -----	232,642
1908 -----	208,950
1909 -----	193,700
1910 -----	237,475
1911 -----	51,824
1912 -----	23,050
1913 -----	13,740
1914 -----	3,970
Total -----	\$2,080,041

Graphite.

Reference: State Mineralogist Report XIII.

Graphite has been produced from time to time in the State, but it is difficult for these deposits, which are not particularly pure, to compete with foreign supplies which go on the market almost directly as they come from the deposit.

The annual graphite production of the United States amounts to about \$250,000; the yearly imports have a value of approximately two million dollars. These facts show the possibilities which are open to this branch of the mineral industry provided, of course, that investigation would show sufficient amounts of high grade material to compete with the imported article, which at the present time comes largely from Ceylon. Low grade ores are concentrated with considerable difficulty and the electric process of manufacturing artificial graphite from coal has been perfected to such a degree that only deposits of natural graphite of a superior quality can be exploited with any certainty of success.

On account of its unfusibility and resistance to the action of molten metals graphite is very valuable. It is also largely used in the manufacture of electrical appliances, of "lead" pencils, as a lubricant and in many other ways. Amorphous or "lump" graphite, commonly carrying many impurities, is worth as low as \$10 a ton. For some purposes, such as foundry facings, etc., the low grade material is very satisfactory. The price increases with the grade of the material until the best quality crystalline variety, ranges as high as \$200 per ton.

Occurrence of graphite has been reported at various times from Calaveras, Fresno, Los Angeles, Mendocino, San Bernardino, Siskiyou, Sonoma, and Tuolumne counties.

During 1914, no production was reported in this State. The previous production by years is as follows:

Year	Pounds	Value
1901 -----	128,000	\$4,480
1902 -----	84,000	1,680
1913 -----	2,500	25
Totals -----	214,500	\$6,185

Gypsum.

Reference: Bulletins 38, 67.

Gypsum is widely distributed throughout the State, and is produced to a considerable extent, to supply the fertilizer manufacturers and the manufacturers of plaster and cement. During 1914 the production by counties was as follows:

County	Tons	Value
Kern -----	82	\$320
Kings -----	20	80
Monterey -----	7,000	21,000
Riverside -----	5,300	7,825
San Bernardino -----	17,332	49,150
Totals -----	29,734	\$78,375

Total annual production of gypsum in California since such records have been compiled by this Bureau is as follows:

Year	Tons	Value
1887 -----	2,700	\$27,000
1888 -----	2,500	25,000
1889 -----	3,000	30,000
1890 -----	3,000	30,000
1891 -----	2,000	20,000
1892 -----	2,000	20,000
1893 -----	1,620	14,280
1894 -----	2,446	24,584
1895 -----	5,158	51,014
1896 -----	1,310	12,580
1897 -----	2,200	19,250
1898 -----	3,100	23,600
1899 -----	3,663	14,950
1900 -----	2,522	10,088
1901 -----	3,875	38,750
1902 -----	10,200	53,500
1903 -----	6,914	46,441
1904 -----	8,350	56,592
1905 -----	12,850	54,500
1906 -----	21,000	69,000
1907 -----	8,900	57,700
1908 -----	34,600	155,400
1909 -----	30,700	138,176
1910 -----	45,294	129,152
1911 -----	31,457	101,475
1912 -----	37,529	117,388
1913 -----	47,100	135,050
1914 -----	29,734	78,375
Totals -----	365,722	\$1,553,845

Infusorial Earth.

Reference: State Mineralogist Reports II, XII, XIII. Bulletin 38.

Infusorial, or diatomaceous, earth—sometimes called tripolite—is a very light and extremely porous chalk-like material composed of pure silica which has been laid down under water and consists of the remains of microscopical infusoria and diatoms. Its principal commercial use is as an absorbent. It is also a first-class non-conductor of heat, is used in the manufacture of scouring soap and polishing powders, and in making some classes of refractory brick. The most important deposits in California thus far known are located in Los Angeles, Monterey, Orange, San Benito, San Bernardino, San Luis Obispo, Santa Barbara, Shasta, and Tehama counties.

During 1914 there were four actively operated quarries producing this material, and three additional properties were reported idle.

Production during that time amounted to 12,840 tons, valued at \$80,350.

The first recorded production of this material in California occurred in 1889; total amount and value of output, to date, are as follows:

Year	Tons	Value
1889 -----	39	\$1,335
1893 -----	50	2,000
1894 -----	51	2,040
1897 -----	5	200
1902 -----	422	2,532
1903 -----	2,703	16,015
1904 -----	6,950	112,282
1905 -----	3,000	15,000
1906 -----	2,430	14,400
1907 -----	2,531	28,948
1908 -----	2,950	32,012
1909 -----	500	3,500
1910 -----	1,843	17,617
1911 -----	2,194	19,670
1912 -----	4,129	17,074
1913 -----	8,645	35,968
1914 -----	12,840	80,350
Totals -----	51,282	\$400,943

It will be noted that the average price varies widely from year to year. This fact is true in case of many of the industrial materials. The quality of the product fluctuates, as does the demand; when both are favorable the maximum price obtains.

Limestone.

Reference: State Mineralogist Reports IV, XII. Bulletin 38.

Limestone was produced in ten counties during 1914, to the amount of 572,272 tons, valued at \$517,713. This amount does not include the limestone used in the manufacture of cement or in lime, but accounts for that used as smelter flux and other manufacturing processes, and a considerable amount which is used as road metal.

Distribution by counties of the 1914 output is as follows:

County	Tons	Value
Alameda -----	50	\$250
Contra Costa -----	32,657	43,661
Placer -----	202,575	202,575
San Bernardino -----	23,006	20,880
San Mateo -----	153,329	75,941
Santa Barbara -----	6,157	11,263
Santa Cruz -----	14,666	25,082
Shasta -----	36,997	30,026
Solano -----	86,128	86,128
Tuolumne -----	16,707	21,907
Totals -----	572,272	\$517,713

In the early reports of this Bureau values for lime and limestone were not segregated. The following tabulation shows the total combined value of such material since records for the State were first compiled, in 1887, to date:

Year	Value
1887	\$368,750
1888	381,750
1889	416,780
1890	350,000
1891	300,000
1892	300,000
1893	301,276
1894	337,975
1895	457,784
1896	332,617
1897	291,465
1898	278,558
1899	343,760
1900	315,231
1901	434,133
1902	460,140
1903	582,268
1904	658,956
1905	878,647
1906	925,887
1907	1,162,417
1908	676,507
1909	997,745
1910	1,058,891
1911	843,778
1912	1,034,688
1913	803,002
1914	896,376
Totals	\$16,189,381

Manganese.

Reference: State Mineralogist Reports XII, XIII. Bulletins 38, 67.

Manganese is reported to exist in many localities in the State; but past production, particularly since the discontinuance of the chlorination process in the metallurgy of gold, has been relatively unimportant. During 1914 there was reported a production of 150 tons, valued at \$1,500. Manganese is used in the steel industry; in the manufacture of paint, glass, pottery; in the chemical laboratory, etc. Local demand is very small. The advent of electricity in the metallurgy of iron promises to enlarge the field for the use of the manganese deposits of California, and another year should show a marked increase in the output of this substance, particularly in Mendocino and Alameda counties.

The production of manganese ore in California annually since 1887 follows:

Year	Tons	Value
1887	1,000	\$9,000
1888	1,500	13,500
1889	53	901
1890	386	3,176
1891	705	3,830
1892	300	3,000
1893	270	4,050
1894	523	5,512
1895	880	8,200
1896	518	3,415
1897	504	4,080
1898	440	2,102
1899	295	3,165
1900	131	1,310
1901	425	4,405
1902	870	7,140
1903	1	25
1904	60	900
1905		
1906	1	30
1907	1	25
1908	321	5,785
1909	3	75
1910	265	4,235
1911	2	40
1912	22	400
1913		
1914	150	1,500
Totals	9,626	\$89,801

Mica.

Reference: State Mineralogist Report II. Bulletin 38.

No production of mica has recently been reported. Production in previous years is as follows:

Year	Tons	Value
1902	50	\$2,500
1903	50	3,800
1904	50	3,000
Totals	150	\$9,300

Lithia mica, utilized in the manufacture of artificial mineral water, fireworks, etc., was mined and sold in San Diego County during the years 1899-1905 inclusive, but there has been no commercial production since the latter date.

Lithia mica total production in the State is as follows:

Year	Tons	Value
1899 -----	124	\$4,600
1900 -----	440	11,000
1901 -----	1,100	27,500
1902 -----	822	31,880
1903 -----	700	27,300
1904 -----	641	25,000
1905 -----	25	276
Totals -----	3,852	\$127,556

Mineral Paint.

Reference: State Mineralogist Reports XII, XIII. Bulletin 38.

Mineral paint was produced in California in 1914, from two counties, as follows:

County	Tons	Value
San Bernardino -----	80	\$561
Stanislaus -----	52	286
Totals -----	132	\$847

Deposits of more or less importance are located in Calaveras, Kern, Lake, Los Angeles, Kings, Nevada, Riverside, Sonoma, and Stanislaus counties.

The first recorded production of this material in the State was in the year 1890. Production, showing annual amount and value, to date since that time is given herewith:

Year	Tons	Value
1890	40	\$480
1891	22	880
1892	25	750
1893	590	26,795
1894	610	14,140
1895	750	8,425
1896	395	5,540
1897	578	8,165
1898	653	9,698
1899	1,704	20,294
1900	529	3,993
1901	325	875
1902	589	1,533
1903	2,370	3,720
1904	270	1,985
1905	754	4,025
1906	250	1,720
1907	250	1,720
1908	335	2,250
1909	305	2,325
1910	200	2,040
1911	186	1,184
1912	300	1,800
1913	303	1,780
1914	132	847
Totals	12,465	\$126,964

Mineral Water.

Reference: State Mineralogist Reports VI, XII, XIII. U. S. G. S.,
Water Supply, Paper 338.

A widespread production of mineral water is shown by the following table for 1914. These figures refer to mineral water actually bottled and sold. Water from some of the springs having a decided medicinal value brings a price many times higher than the average shown, while in some cases the water is used merely for drinking purposes and sells for a nominal figure.

MINERAL INDUSTRY OF CALIFORNIA.

County	Gallons	Value
Butte -----	1,200	\$300
Calaveras -----	15,508	6,517
Colusa -----	92,000	24,951
Contra Costa -----	364,288	3,643
Lake -----	254,150	47,267
Los Angeles -----	331,151	8,025
Marin -----	60,000	9,000
Monterey -----	26,000	7,900
Napa -----	142,940	73,280
Riverside -----	100,000	2,000
San Benito -----	700	280
San Bernardino -----	44,200	5,100
San Diego -----	8,865	911
San Luis Obispo -----	1,000	250
Santa Barbara -----	160,400	152,432
Santa Clara -----	29,000	10,750
Shasta -----	30,000	6,850
Siskiyou -----	650,000	65,000
Solano -----	43,020	5,208
Sonoma -----	89,015	46,160
Tehama -----	100	100
Trinity -----	35	245
Totals -----	2,443,572	\$476,169

Amount and value of mineral water produced in California since 1887 are given herewith:

Year	Gallons	Value
1887 -----	618,162	\$144,368
1888 -----	1,112,202	252,990
1889 -----	808,625	252,241
1890 -----	258,722	89,786
1891 -----	334,553	139,959
1892 -----	331,875	162,019
1893 -----	383,179	90,667
1894 -----	402,275	184,481
1895 -----	701,397	291,500
1896 -----	808,843	337,434
1897 -----	1,508,192	345,863
1898 -----	1,429,809	213,817
1899 -----	1,338,537	406,691
1900 -----	2,456,115	268,607
1901 -----	1,555,328	559,057
1902 -----	1,701,142	612,477
1903 -----	2,056,340	558,201
1904 -----	2,430,320	496,946
1905 -----	2,194,150	538,700
1906 -----	1,585,690	478,186
1907 -----	2,924,269	544,016
1908 -----	2,789,715	560,507
1909 -----	2,449,834	465,488
1910 -----	2,335,259	522,009
1911 -----	2,637,669	590,654
1912 -----	2,497,794	529,384
1913 -----	2,350,792	599,748
1914 -----	2,443,572	476,169
Totals -----	44,444,360	\$10,711,965

Pumice.

Reference: State Mineralogist Report XII (see Tufa). Bulletin 38.

Pumice, or volcanic ash, is of common occurrence in California, particularly in the Sierra Nevada mountains; and almost any demand for this substance in any form or quality could be readily met. During 1914 a production of 50 tons is reported, from Madera County, valued at \$1,000. Probably the future will show a considerable increase in the use of this material in building operations, owing to its extreme lightness.

Pyrite.

Reference: Bulletin 38.

Pyrite is extensively mined in several places, and used in the manufacture of sulphuric acid. The following figures show the production for 1914:

County	Tons	Value
Alameda -----	9,829	\$34,696
Shasta -----	69,438	195,362
Totals -----	79,267	230,058

The total production in California to date is as follows:

Year	Tons	Value
1898 -----	6,000	\$30,000
1899 -----	5,400	28,620
1900 -----	3,642	21,133
1901 -----	4,578	18,429
1902 -----	17,525	60,306
1903 -----	24,311	94,000
1904 -----	15,043	62,992
1905 -----	15,503	63,958
1906 -----	46,689	145,895
1907 -----	82,270	251,774
1908 -----	107,081	610,335
1909 -----	457,867	1,389,802
1910 -----	42,621	179,862
1911 -----	54,225	182,954
1912 -----	69,872	203,470
1913 -----	79,000	218,537
1914 -----	79,267	230,058
Totals -----	1,110,894	\$3,792,125

This does not include the vast quantities of pyrite which are otherwise treated for their valuable metal contents.

Quartz.

Reference: Bulletin 67.

Quartz production in California during 1914 was as follows:

County	Tons	Value
Amador	1,250	\$2,400
Tulare	1,250	2,400
Totals	2,500	\$4,800

Sand, Glass.

Reference: State Mineralogist Report IX. (See Glass.) Bulletin 38.

Practically all the glass sand produced in California occurs as such and needs no grinding. There are various deposits of quartz which could be utilized for glass making, but to date there is no commercial production of this class of material.

Glass sand has been produced in the following counties of the State: Alameda, Amador, El Dorado, Los Angeles, Monterey, Orange, Placer, Riverside, San Joaquin, and Tulare. The chief producing centers have been Monterey and Los Angeles counties, the outstanding feature for 1914 being the entrance of Amador to the list. The industry is of little importance, so far, because of the fact that the available deposits are not of a grade which will produce first-class glass. Many high-grade deposits are known, but almost without exception transportation facilities are so poor that the owners are unable to compete with the foreign sand which is brought in as ballast and sold at a low price.

Production for 1914 was as follows:

County	Tons	Value
Amador	16,688	\$9,855
Monterey	9,210	7,633
San Bernardino	140	400
Totals	26,038	\$17,888

Total glass sand production in California since the inception of the industry in 1899, is shown below.

Year	Tons	Value
1899 -----	2,000	\$2,000
1900 -----	2,000	2,000
1901 -----	4,500	15,750
1902 -----	4,500	12,225
1903 -----	7,725	7,725
1904 -----	10,004	12,276
1905 -----	9,257	8,121
1906 -----	9,750	13,375
1907 -----	11,065	8,178
1908 -----	9,255	22,045
1909 -----	12,259	25,517
1910 -----	9,124	8,165
1911 -----	8,620	8,672
1912 -----	13,075	15,404
1913 -----	14,578	14,143
1914 -----	26,038	17,888
Totals -----	153,750	\$193,484

Soapstone.

Reference: State Mineralogist Report XII. Bulletins 38, 67.

Soapstone—also called talc or steatite—occurs widely distributed throughout California. It is found as a hydration product in the alteration of magnesian silicates, and is often associated with serpentine and actinolite. But few deposits have been proven of especial value to date, although there is an undoubted future for this branch of the mineral industry in the State. It is used in making paper, toilet articles, soap, lubricants, tiling, etc., and for such is ordinarily ground to about 200 mesh before marketing. In this condition it brings about \$15 per ton.

The production of soapstone by counties during 1914 was as follows:

County	Tons	Value
Amador -----	610	\$2,440
Inyo -----	390	2,060
Totals -----	1,000	\$4,500

Production has been intermittent in the State since 1893, as shown in the following table:

Year	Tons	Value
1893 -----	400	\$17,750
1895 -----	25	375
1901 -----	10	119
1902 -----	14	288
1903 -----	219	10,124
1904 -----	228	2,315
1905 -----	300	3,000
1906 -----		
1907 -----		
1908 -----	3	48
1909 -----	33	280
1910 -----	740	7,260
1911 -----		
1912 -----	1,750	7,350
1913 -----	1,350	6,150
1914 -----	1,000	4,500
Totals -----	6,072	\$59,559

Sulphur.

Reference: State Mineralogist Reports IV, XIII. Bulletins 38, 67.

There is no commercial output of native sulphur in California although this mineral has been found to some extent in Colusa, Imperial, Inyo, Kern, Lake, Mariposa, San Bernardino, Sonoma, Tehama, and Ventura counties. Production of sulphur is very improbable, in the immediate future, although possibilities of such a condition remain to be proven.

CHAPTER SIX.

SALINES.

Borax, salt, soda, nitrates and potash are included under this heading. Borax and salt have been produced in California since the sixties, although no official records of output were kept by this Bureau previous to 1887. Soda has had a virtually continuous production since 1894. The nitrates and potash have never been commercially produced in the State, although the future possibilities along these lines are indeed great.

The desert portions of California, located largely in Inyo, Kern, Riverside, Imperial, and San Bernardino counties, are rich in the possession of salines of all descriptions. Ancient lake beds of vast extent are found there, many of which have never yet been exploited to any extent.

The following tabulation shows amount and value of the saline minerals produced in California during the years 1913 and 1914, with increase or decrease in value for 1914 as compared with the previous year:

Substance	1913		1914		Increase, decrease, value
	Tons	Value	Tons	Value	
Borax -----	58,051	\$1,491,530	62,500	\$1,483,500	\$8,030—
Potash -----			10	460	460+
Salt -----	204,407	462,681	223,806	583,553	120,870+
Soda -----	1,861	24,936	6,522	115,396	90,460+
Totals -----	264,319	\$1,979,147	292,838	\$2,182,909	\$203,760+

Borax.

Reference: State Mineralogist Reports III, X, XII, XIII. Bulletin 24.

Borax was first discovered in California in the waters of Tuscan Springs in Tehama County, January 8, 1856. Borax Lake, in Lake County, was discovered in September of the same year, by Dr. John A. Veatch. This deposit was worked in 1864-65-66, and during that time produced 1,181,365 pounds of borax. Not till 1873 were the borax deposits of Inyo and San Bernardino counties discovered.

Aside from the above mentioned localities borax is known in Kern, Los Angeles, Imperial, Solano, and Ventura counties.

California is the only state in America producing borax. During 1914 three producers reported an output of 62,500 tons, valued at \$1,483,500.

Value of the State's borax output since 1887 is shown in the following table:

Year	Value	Year	Value
1887 -----	\$116,689	1902 -----	\$2,234,994
1888 -----	196,636	1903 -----	661,400
1889 -----	145,473	1904 -----	698,810
1890 -----	480,152	1905 -----	1,019,158
1891 -----	640,000	1906 -----	1,182,410
1892 -----	838,787	1907 -----	1,200,913
1893 -----	593,292	1908 -----	1,117,000
1894 -----	807,807	1909 -----	1,163,960
1895 -----	595,900	1910 -----	1,177,960
1896 -----	675,400	1911 -----	1,456,672
1897 -----	1,080,000	1912 -----	1,122,713
1898 -----	1,153,000	1913 -----	1,491,530
1899 -----	1,139,882	1914 -----	1,483,500
1900 -----	1,013,251		
1901 -----	982,380	Total -----	\$26,469,669

Nitrates.

Nitrates of sodium, potassium and calcium have been found in various places in the desert regions of the State but no deposit of commercial value has been located as yet. Interest in this class of mineral substance is increasing and closer search may be rewarded by valuable discoveries.

Potash.

Potash has not previously been commercially produced in California and only during the past few years has this substance created general interest in the State. Considerable money has been spent recently in preliminary work with a view toward developing what are claimed to be immense deposits of potash which lie in the old lake beds of the desert portions of California. The imports of this material from foreign countries have an annual value of many millions of dollars, and a domestic production would be of great value.

During 1914 one producer reported 10 tons reduced from kelp, and valued at \$460.

Salt.

Reference: State Mineralogist Reports II, XII, XIII. Bulletin 24.

Most of the salt produced in California is obtained by evaporating the waters of the Pacific Ocean, plants being located on the shores of San Francisco Bay, at Long Beach, and at San Diego. Additional amounts are derived from lakes and lake beds in the desert regions of the State. The salt production of San Bernardino County is derived from deposits of rock salt which are worked by means of quarrying with a steam shovel. A small amount of valuable medicinal salts was produced during the year in Mono and Tehama counties, by evaporation from mineral springs.

Distribution by counties is given herewith:

County	Tons	Value
Alameda -----	126,983	\$292,641
Inyo -----	13,500	54,000
Kern -----	20,000	50,000
Los Angeles -----	20,000	60,000
Modoc -----	40	720
Mono -----	* $\frac{1}{2}$	150
San Bernardino -----	482	2,892
San Diego -----	15,300	46,200
San Mateo -----	27,500	76,750
Tehama -----	†1/11	200
Totals -----	223,806	\$583,553

*Medicinal.

†Mineral.

Amount and value of annual production of salt in California from 1887 to date is shown in the following tabulation:

Year	Tons	Value
1887 -----	28,000	\$112,000
1888 -----	30,800	92,400
1889 -----	21,000	63,000
1890 -----	8,729	57,085
1891 -----	20,094	90,303
1892 -----	23,570	104,788
1893 -----	50,500	213,000
1894 -----	49,131	140,087
1895 -----	53,031	150,576
1896 -----	64,743	153,244
1897 -----	67,851	157,520
1898 -----	93,421	170,855
1899 -----	82,654	149,588
1900 -----	89,338	204,754
1901 -----	126,218	366,376
1902 -----	115,208	205,876
1903 -----	102,895	211,365
1904 -----	95,968	187,300
1905 -----	77,118	141,925
1906 -----	101,650	213,228
1907 -----	88,063	310,967
1908 -----	121,764	281,469
1909 -----	155,680	414,708
1910 -----	174,920	395,417
1911 -----	173,332	324,255
1912 -----	185,721	383,370
1913 -----	204,407	462,681
1914 -----	223,806	583,553
Totals -----	2,629,612	\$6,341,690

Soda.

Reference: State Mineralogist Reports XII, XIII. Bulletin 24.

Soda and soda ash were produced during 1914, amounting to 6,522 tons, valued at \$115,396.

The total output, showing amount and value, of this product since the inception of this branch of the mineral industry in California is given in the table which follows:

Year	Tons	Value
1894 -----	1,530	\$20,000
1895 -----	1,900	47,500
1896 -----	3,000	65,000
1897 -----	5,000	110,000
1898 -----	7,000	154,000
1899 -----	10,000	250,000
1900 -----	1,000	50,000
1901 -----	8,000	400,000
1902 -----	7,000	50,000
1903 -----	18,000	27,000
1904 -----	12,000	18,000
1905 -----	15,000	22,500
1906 -----	12,000	18,000
1907 -----		
1908 -----	9,600	14,400
1909 -----	7,712	11,593
1910 -----	8,125	11,862
1911 -----	9,023	52,887
1912 -----	7,200	37,094
1913 -----	1,861	24,936
1914 -----	6,522	115,396
Totals -----	151,473	\$1,500,168

CHAPTER SEVEN.

MINERAL PRODUCTION OF CALIFORNIA BY COUNTIES.

Introductory.

The State of California includes an area of 155,652 square miles and is divided into fifty-eight counties. Some mineral of commercial value exists in every county, and during 1914 active production was reported to the State Mining Bureau from fifty-six counties of the fifty-eight. In the mountainous portions of the State are found the vein forming minerals, largely. In the vast desert regions of southeastern California ancient lake beds afford an unlimited supply of saline deposits. Underlying the interior valleys of the central and southern portion of the State are the largest pools of crude oil in the world. Building stones and mineral earths of all descriptions are widely distributed throughout the length and breadth of the State.

The counties, with their mineral resources, production for 1914, etc., will be considered in detail in this chapter.*

Value of California Mineral Production, by County, for 1914, Arranged in the Order of Their Importance.

1. Kern	\$28,047,957	32. San Mateo	\$246,478
2. Orange	8,831,763	33. Imperial	239,140
3. Fresno	7,484,231	34. Humboldt	233,574
4. Shasta	5,044,930	35. Madera	203,517
5. Los Angeles	4,665,504	36. Mariposa	187,870
6. Nevada	3,329,179	37. Plumas	164,809
7. Amador	3,230,075	38. Tulare	161,252
8. Yuba	2,820,895	39. El Dorado	150,086
9. Santa Barbara	2,686,309	40. San Joaquin	129,930
10. Sacramento	2,632,658	41. San Francisco	119,889
11. Inyo	2,091,362	42. Monterey	113,831
12. Calaveras	2,068,343	43. Merced	112,500
13. Butte	1,755,315	44. Lake	63,503
14. Solano	1,683,866	45. San Luis Obispo	63,465
15. Santa Cruz	1,642,958	46. Colusa	32,251
16. San Bernardino	1,614,606	47. Glenn	30,553
17. Riverside	1,579,586	48. Mono	17,150
18. Contra Costa	1,149,321	49. Stanislaus	25,882
19. Placer	1,099,743	50. Del Norte	5,270
20. Tuolumne	1,059,118	51. Lassen	4,324
21. Ventura	1,000,729	52. Modoc	1,730
22. Napa	971,748	53. Kings	740
23. Alameda	870,427	54. Yolo	736
24. Trinity	753,745	55. Mendocino	560
25. Sierra	733,000	56. Tehama	300
26. Marin	554,137	57. Alpine	0
27. San Benito	436,259	58. Sutter	0
28. Siskiyou	384,752	Asbestos	*1,530
29. Sonoma	326,144	Platinum	*14,800
30. San Diego	315,267		
31. Santa Clara	266,956		
		Total	\$93,436,553

*Includes gold and silver production of Stanislaus.

*See Merced.

*Asbestos from Alameda, Calaveras, El Dorado, Placer, Shasta. Amounts not separable.

*Platinum from Butte, Del Norte, Sacramento, Siskiyou, Yuba. Amounts not separable. See also p. 33.

*See also supplement to Chapter Three—Metals, pp. 33, 34.

Alameda.

Alameda County, while in no sense one of the "mining counties" of the State, comes twenty-third on the list, with a value of mineral products for 1914 of \$870,427, an increase over the 1913 total, which was \$844,217. The principal mineral resources of this county consist of asbestos, brick, chromite, clay, coal, lime, magnesite, manganese, pyrite, salt, soapstone, and the stone industry.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	22,668 M	\$159,205
Clay -----	5,000 tons	1,000
Limestone -----	50 tons	250
Magnesite -----	150 tons	1,500
Miscellaneous stone -----		381,135
Pyrite -----	9,829 tons	34,696
Salt -----	126,983 tons	292,641
Total -----		\$870,427

Alpine.

Alpine has usually shown a small production of gold and silver, but dropped out of the list of producing counties for 1914.

This county lies just south of Lake Tahoe, in the high Sierra Nevada range of mountains. Its area is 776 square miles, containing a population of but 309 persons. Transportation is by wagon or mule back, and facilities in general are lacking to promote development work of any kind.

The mineral resources of this section are varied and the country has not yet been thoroughly prospected. Barium, copper, gold, gypsum, lead, limestone, pyrite, rose quartz, silver, tourmaline, and zinc have been found here to some extent.

Amador.

Area: 601 square miles.

Population: 9,086 (1910 census).

The value of Amador County's mineral production increased from \$3,013,180 in 1913 to \$3,230,075 in 1914, thus taking seventh place on the list of counties in the State as regards total value of mineral substances marketed.

Although having an output consisting of twelve different minerals, the leading product, gold, makes up nearly 98 per cent of the entire total. Amador is second in the State in gold production.

The mineral resources of this county are, in the main, as follows: Asbestos, brick, chromite, clay, coal, copper, gold, lime, quartz crystals, sand-glass, sandstone, silver, soapstone, and stone industry.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	2,500 M	\$50,000
Clay -----	32,223 tons	33,114
Coal -----	5,700 tons	10,062
Copper -----	5,251 lbs.	694
Gold -----		3,100,000
Lead -----	44 lbs.	2
Lime -----	1,540 bbls.	2,008
Quartz -----	1,250 tons	2,400
Sand, glass -----	16,688 tons	9,855
Sandstone -----	3,960 cu. ft.	1,500
Silver -----		18,000
Soapstone -----	610 tons	2,440
Total -----		\$3,230,075

Butte.

Area: 1,722 square miles.

Population: 27,301 (1910 census).

Location: North central portion of State.

Butte, thirteenth county in California in regard to the value of its mineral output, reported a commercial production of six mineral substances having a total value of \$1,755,315, as compared with \$2,533,940 for 1913. As will be noted in the following tabulation, gold is by far the most important item. Butte stands fifth among the gold-producing counties of the State. Among the principal mineral resources of this section are asbestos, barytes, chromite, gems, gold, limestone, marble, mineral water, platinum minerals, silver, and stone industry.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Gems -----		\$100
Gold -----		1,700,000
Lead -----	513 lbs.	20
Mineral water -----	1,200 gals.	300
Miscellaneous stone -----		50,895
Silver -----		4,000
Total -----		\$1,755,315

Calaveras.

Area: 1,027 square miles.

Population: 9,171.

Location: East central portion of State—Mother Lode district.

Calaveras County reported production of seven different minerals, valued at \$2,068,343 during the year 1914, as compared with the 1913 output worth \$2,042,901. Gold, copper and silver are the chief mineral substances produced. In regard to total value of mineral output Calaveras stands twelfth among the counties of the State; it is sixth in gold, second in copper, and third in silver.

The principal mineral resources developed and undeveloped are: Asbestos, barytes, chromite, clay, copper, fuller's earth, gold, graphite, limestone, magnesite, marble, mineral paint, mineral water, platinum minerals, pyrite, quartz crystals, silver, soapstone, and the stone industry.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Chromite -----	650 tons	\$4,550
Clay -----	280 tons	280
Copper -----	4,468,998 lbs.	594,377
Fuller's earth -----	290 tons	2,618
Gold -----		1,400,000
Lead -----	30 lbs.	1
Mineral water -----	15,508 gals.	6,517
Silver -----		60,000
Total -----		\$2,068,343

Colusa.

Area: 1,140 square miles.

Population: 7,732 (1910 census).

Location: Sacramento Valley.

Colusa County lies largely in the basin of the Sacramento Valley. Its western border, however, rises into the foothills of the Coast Range of mountains, and its mineral resources—to a great extent undeveloped—include coal, chromite, copper, gypsum, manganese, mineral water, pyrite, quicksilver, sandstone, stone industry, sulphur, and in some places traces of gold and silver.

The value of the 1914 production was \$32,251, a decrease from the 1913 figures of \$48,481, giving it forty-sixth place.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Mineral water -----	92,000 gals.	\$24,951
Sandstone -----	16,000 cu. ft.	7,300
Total -----		\$32,251

Contra Costa.

Contra Costa, like Alameda County, lies off the eastern shores of San Francisco Bay, and is not commonly considered among the mineral-producing counties of the State. It stands eighteenth on the list in this respect, however, with an output valued at \$1,149,321 for the calendar year 1914. Various structural materials make up the chief items. Among the others are brick, clay, coal, gypsum, limestone, manganese, mineral water, soapstone, and stone industry.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	16,064 M	\$129,543
Coal -----	67 tons	268
Lime -----	5,666 tons	4,724
Limestone -----	32,657 tons	43,661
Mineral water -----	364,288 gals.	3,643
Miscellaneous stone -----		308,727
Other minerals -----		658,755
Total -----		\$1,149,321

Del Norte.

Area: 1,024 square miles.

Population: 2,417 (1910 census).

Location: Extreme northwest corner of State.

Transportation: Wagon and mule back.

Del Norte rivals Alpine County in regard to inaccessibility. Like the latter county also, given transportation and kindred facilities, this portion of the State presents a wide field for development along mining lines especially. Its chief mineral resources, largely untouched, are chromite, copper, gems, gold, graphite, iron, platinum minerals, silver and stone industry.

Commercial production for 1914, giving it fiftieth place, was as follows:

Substance	Value
Gold -----	\$2,000
Miscellaneous stone -----	3,250
Silver -----	20
Total -----	\$5,270

El Dorado.

Area: 1,753 square miles.

Population: 7,492 (1910 census).

Location: East central portion of the State northernmost of the Mother Lode counties.

El Dorado County, which marks the spot where gold was first discovered in California, comes thirty-ninth on the list of counties ranked according to the value of their total mineral production during the year 1914. The principal mineral resources of this section, many of them undeveloped, are: Asbestos, barytes, chromite, clay, copper, gems, gold, iron, molybdenum, limestone, quartz crystals, quicksilver, sand-glass, slate, soapstone, silver, and stone industry.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Gold -----		\$135,000
Lead -----	90 lbs.	4
Lime -----	14,000 bbls.	12,082
Miscellaneous stone -----		2,600
Silver -----		400
Total -----		\$150,086

Fresno.

Area: 5,950 square miles.

Population: 75,657 (1910 census).

Location: South central portion of State.

Fresno County, third in importance as a mineral producer among the counties of California, reported an output for 1914 of seven mineral substances with a total value of \$7,484,231, a decrease from the reported 1913 production, which was worth \$8,438,810. The great bulk of the above value is derived from the petroleum production of the Coalinga field.

The mineral resources of this county are many, and, aside from crude oil, are far from being fully developed. They include asbestos,

barytes, brick, chromite, copper, gems, gold, graphite, gypsum, iron, magnesite, natural gas, petroleum, quicksilver, silver, and stone industry.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	4,500 M	\$3,600
Gold -----		10,000
Miscellaneous stone -----		237,963
Natural gas -----	250,000 M cu. ft.	15,000
Petroleum -----	15,952,190 bbls.	7,210,389
Quicksilver -----	148 flasks	7,259
Silver -----		20
Total -----		\$7,484,231

Glenn.

Glenn County, standing forty-seventh, owes its position among the mineral-producing counties of the State to the presence of large deposits of sand and gravel which are annually worked, the product being used for railroad ballast, etc. In the foothills in the western portion of the county traces of chromite, copper, manganese, sandstone, and soapstone have been found.

Commercial production for 1914 was as follows:

Substance	Value
Miscellaneous stone -----	\$30,553

Humboldt.

Area: 3,634 square miles.

Population: 33,857 (1910 census).

Location: Northwestern portion of State, bordering on Pacific Ocean.

Humboldt County is almost entirely mountainous, transportation within its limits being very largely by wagon road and trail, and until recently was reached from the outside world by steamer only. The county is rich in mineral resources, chief among which are brick, chromite, coal, clay, copper, gold, graphite, iron, mineral water, natural gas, petroleum, platinum, silver, and stone industry.

Five mineral substances, as shown by the table given below, having a total value of \$233,574, were produced in 1914, as compared with the 1913 output, worth \$471,052. Humboldt ranks thirty-fourth among the counties of the State for the year.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	607 M	\$6,120
Gold -----		19,000
Miscellaneous stone -----		208,204
Natural gas -----		150
Silver -----		100
Total -----		\$233,574

Imperial.

Area: 4,089 square miles.

Population: 30,000 (estimated by board of supervisors).

Location: Extreme southeast corner of the State.

During 1914 Imperial County produced four mineral substances having a total value of \$239,140, as compared with the 1913 output, worth \$95,054. Its rank is thirty-third, and the substantial increase is due to gold, resulting from the reopening of mines at Ogilby. This county contains large undeveloped deposits of gold, gypsum, lead, marble, salt, and silver.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	4,900 M	\$29,400
Copper -----	13,081 lbs.	1,740
Gold -----		200,000
Silver -----		8,000
Total -----		\$239,140

Inyo.

Area: 10,019 square miles.

Population: 6,974 (1910 census).

Location: Lies on eastern border of State, north of San Bernardino County.

Inyo, the second largest county in the State and containing less than one inhabitant per square mile, is extremely interesting from a mineralogical point of view. It is noted because of the fact that within its borders are located both the highest point, Mount Whitney (elevation 14,502 feet), and the lowest point, Death Valley (elevation 290 feet below sea level), in the United States. In the higher mountainous sections are found many vein-forming minerals, and in the ancient lake beds of Death Valley saline deposits of all kinds exist.

Inyo's mineral production during the year 1914 reached a value of \$2,091,362, the county standing eleventh among the counties of the State in this respect. Its mineral resources include antimony, asbestos, barytes, bismuth, borax, copper, gems, gold, gypsum, lead, magnesite, marble, molybdenum, mineral water, nitre, platinum, quick-silver, salt, silver, soapstone, soda, sulphur, tungsten, and zinc.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Borax -----	49,297 tons	\$1,133,831
Copper -----	336,423 lbs.	44,744
Gold -----		275,000
Lead -----	4,626,934 lbs.	180,450
Marble -----	3,500 cu. ft.	10,500
Salt -----	13,500 tons	54,000
Silver -----		255,000
Soapstone -----	390 tons	2,000
Zinc -----	399,641 lbs.	20,381
Other minerals -----		115,396
Total -----		\$2,091,362

Kern.

Area: 8,003 square miles.

Population: 55,000 (estimated by board of supervisors).

Location: South central portion of State.

Kern County, because of its immense productive oil fields, stands pre-eminent among all counties of California in the value of its mineral output, the exact figures for 1914 being \$28,047,957. This is larger by more than nineteen million dollars than the succeeding county on the list. This figure also exceeds the value of the total gold output of the entire State by approximately \$7,000,000. The 1913 mineral output for the county was worth \$28,406,193.

Among the mineral resources, developed and undeveloped, of this section are: Antimony, asbestos, asphalt, barytes, borax, brick, clay, copper, fuller's earth, gems, gold, gypsum, iron, lead, limestone, magnesite, marble, mineral paint, natural gas, petroleum, potash, salt, silver, soapstone, soda, sulphur, and tungsten.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	3,834 M	\$29,214
Clay -----	346 tons	172
Copper -----	7,394 lbs.	983
Gold -----		600,000
Gypsum -----	82 tons	320
Lead -----	379 lbs.	15
Lime -----	81,600 bbls.	65,100
Natural gas -----	6,508,868 M cu. ft.	390,532
Petroleum -----	65,332,633 bbls.	26,721,046
Salt -----	20,000 tons	50,000
Silver -----		10,000
Other minerals -----		180,575
Totals -----		\$28,047,957

Kings.

Area: 1,159 square miles.

Population: 16,230 (1910 census).

Location: South central portion of State.

Little development has taken place in Kings County along mineral lines to date. Deposits of fuller's earth, gypsum, mineral paint, natural gas and quicksilver, of undetermined extent, have been found in the county.

In fifty-third place, commercial production for 1914 was as follows:

Substance	Amount	Value
Fuller's earth -----	20 tons	\$160
Gypsum -----	20 tons	80
Natural gas -----	150 M cu. ft.	500
Total -----		\$740

Lake.

Area: 1,278 square miles.

Population: 5,526 (1910 census).

Location: About fifty miles north of San Francisco Bay and the same distance inland from the Pacific Ocean.

On account of its topography and natural beauties, Lake County is sometimes referred to as the Switzerland of America. The mineral resources which exist here are many and varied, actual production being comparatively small, as shown by the table below. Some of the leading minerals found in this section are borax, chromite, clay, gems, gypsum, mineral water, quicksilver, and sulphur.

In forty-fourth place, commercial production for 1914 was as follows:

Substance	Amount	Value
Mineral water -----	254,150 gals.	\$47,267
Quicksilver -----	331 flasks	16,236
Total -----		\$63,503

Lassen.

Area: 4,531 square miles.

Population: 7,000 (estimated by board of supervisors, 1913).

Location: Northeast portion of State.

Lassen County is one of the least explored sections of California. Within the past couple of years a railroad traversing the county north and south has been put in operation, thus affording opportunity for development along mineral and other lines.

Among the mineral resources of this county are copper, gems, gypsum, gold, silver, and sulphur.

In fifty-first place, commercial production for 1914 was as follows:

Substance	Amount	Value
Copper -----	19,089 lbs.	\$2,539
Gold -----		1,000
Miscellaneous stone -----		775
Silver -----		10
Total -----		\$4,324

Los Angeles.

Area: 4,067 square miles.

Population: 800,000 (estimated by Chamber of Commerce, 1913).

Mineral production in Los Angeles County for the year 1914 amounted in value to \$4,665,504, as compared with the 1913 output, worth \$5,833,298. This county ranks fifth in the State as a mineral producer.

Its output of brick was over a million dollars, and that of petroleum amounted nearly to two million dollars. Among its leading mineral resources may be noted asphalt, barytes, borax, brick, chromite, clay, copper, fuller's earth, gems, gold, gypsum, infusorial earth, iron, limestone, marble, mineral paint, mineral water, natural gas, petroleum, salt, glass-sand, sandstone, serpentine, silver, soapstone, and stone industry. Some potash is also found in this county.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Borax -----	13,203 tons	\$349,669
Brick -----	133,557 M	1,244,971
Clay -----	8,263 tons	14,566
Gems -----		2,100
Mineral water -----	331,151 gals.	8,025
Miscellaneous stone -----		953,434
Natural gas -----	1,250,000 M cu. ft.	75,000
Petroleum -----	3,558,690 bbls.	1,957,279
Potash -----	10 tons	460
Salt -----	20,000 tons	60,000
Total -----		\$4,665,504

Madera.

Area: 2,112 square miles.

Population: 15,000 (estimated by Chamber of Commerce, 1913).

Location: East central portion of State.

Madera County produced five mineral substances during the year 1914, having a total value of \$203,517, as compared with the 1913 output worth \$371,867. This county contains deposits of copper, gold, iron, lead, molybdenum, pumice, silver, and building stone.

In thirty-fifth place, commercial production for 1914 was as follows:

Substance	Amount	Value
Copper -----	35,359 lbs.	\$4,703
Gold -----		5,000
Miscellaneous stone -----		192,764
Pumice -----	50 tons	1,000
Silver -----		50
Total -----		\$203,517

Marin.

Area: 529 square miles.

Population: 25,114 (1910 census).

Mineral production in Marin County during the year 1914 reached a value of \$554,137, as compared to the 1913 output, worth \$278,453. The considerable increase was due to three large contracts for rubble and macadam—the Key Route mole, San Francisco waterfront bulkhead and the Exposition roadways—rock for all of which came from Marin County. This county is not especially prolific in minerals, although among its resources along these lines are asbestos, brick, gems, mineral water, soapstone, and stone industry.

In twenty-sixth place, commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	15,000 M	\$55,000
Mineral water -----	60,000 gals.	9,000
Miscellaneous stone -----		490,137
Total -----		\$554,137

Mariposa.

Area: 1,463 square miles.

Population: 3,956 (1910 census).

Location: Most southerly of the Mother Lode counties. East central portion of State.

Mariposa County is one of the distinctly "mining" counties of the State, although it stands thirty-sixth on the list of counties in regard to the value of its mineral output for 1914, with a total of \$187,870, as compared with the 1913 figures of \$246,079.

Its mineral resources are varied, among the more important items being asbestos, barytes, copper, gems, gold, lead, marble, silver, slate, soapstone, and the stone industry.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Barytes -----	2,000 tons	\$3,000
Copper -----	277,472 lbs.	36,904
Gold -----		132,000
Marble -----	100 cu. ft.	100
Miscellaneous stone -----		15,366
Silver -----		500
Total -----		\$187,870

Mendocino.

Area: 3,453 square miles.

Population: 23,929 (1910 census).

Location: Joins Humboldt County on the south and bounded by the Pacific Ocean on the west.

Mendocino's annual mineral production is small, the 1914 output being valued at \$560, ranking it fifty-fifth among the counties. That of 1913, however, was worth \$9,450. In each case crushed rock was the material commercially produced.

Deposits of uncertain value, of asbestos, chromite, copper, graphite, magnesite, and mineral water have been found, as well as traces of

gold and silver. For the coming year there are good prospects for a commercial yield of manganese ore.

Commercial production for 1914 was as follows:

Substance	Value
Miscellaneous stone -----	\$560

Merced.

Area: 1,995 square miles.

Population: 15,148 (1910 census).

Location: About the geographical center of the State.

Merced County as a whole lies in the San Joaquin Valley, and it figures as one of the lesser mineral-producing counties of the State. The 1914 mineral output (in which is included the gold and silver yield of Stanislaus, there being but a single dredge in each), was valued at \$112,500. Copper and crushed rock have also been commercially produced. Undeveloped deposits of antimony, quicksilver, and limestone have been noted in this county, in addition to the foregoing.

Commercial production during 1914 was as follows:

Substance	Value
Gold* -----	\$112,000
Silver* -----	500
Total -----	\$112,500

*Including output of one dredge in Stanislaus County.

Modoc.

Area: 3,823 square miles.

Population: 6,191 (1910 census).

Location: The extreme northeast corner of the State.

Modoc County, like Lassen, has only recently had the benefit of communication with the outside world by rail. It is at the present time, generally speaking, an unexplored country. Among its known mineral resources are: Clay, coal, gold, iron, quicksilver, salt, and silver.

In fifty-second place, commercial production for 1914 was as follows:

Substance	Amount	Value
Gold -----	40 tons	\$1,000
Salt -----		720
Silver -----		10
Total -----		\$1,730

Mono.

Area: 3,030 square miles.

Population: 2,843 (1910 census).

Location: Is bordered by the State of Nevada on the east and is about in the central portion of the State measured on a north and south line.

Gold mining has been carried on in portions of Mono County for many years, although taken as a whole it lies in a rather inaccessible country and has been but superficially explored. It is in the continuation of the highly mineralized belt which was noted in Inyo County and contains among other mineral resources barytes, bismuth, clay, copper, gold, gypsum, iron, lead, limestone, salt, silver and travertine.

In forty-eighth place, commercial production for 1914 was as follows:

Substance	Amount	Value
Gold -----	$\frac{1}{2}$ ton*	\$7,000
Salt -----		150
Silver -----		10,000
Total -----		\$17,150

*Medicinal.

Monterey.

Area: 3,330 square miles.

Population: 24,146 (1910 census).

Location: West central portion of State, bordering on Pacific Ocean.

Monterey County produced ten mineral substances during the year 1914, having a total value of \$113,831, as compared with the 1913 output worth \$178,679. Its mineral resources include brick, clay, copper, coal, feldspar, fuller's earth, gold, silver, gypsum, infusorial earth, limestone, mineral water, petroleum, quicksilver, glass-sand, sandstone, silver, and the stone industry.

In forty-second place, commercial production for 1914 was as follows:

Substance	Amount	Value
Coal -----	5,992 tons	\$17,976
Feldspar -----	700 tons	3,500
Fuller's earth -----	450 tons	3,150
Gold -----		4,000
Gypsum -----	7,000 tons	21,000
Mineral water -----	26,000 gals.	7,900
Miscellaneous stone -----		39,202
Sand, glass -----	9,210 tons	7,633
Silver -----		20
Other minerals -----		9,450
Total -----		\$113,831

Napa.

Area: 783 square miles.

Population: 19,800 (1910 census).

Location: Directly north of San Francisco Bay—one of the “bay counties.”

Napa, because of its production of structural and industrial materials, stands twenty-second on the list of mineral-producing counties in California. Its most important mineral resources are asbestos, barytes, copper, cement, gypsum, magnesite, mineral water, quicksilver, sandstone, soapstone, and stone industry.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Mineral water -----	142,940 gals.	\$73,280
Miscellaneous stone -----		130,316
Quicksilver -----	240 flasks	11,772
Other minerals -----		756,380
Total -----		\$971,748

Nevada.

Area: 974 square miles.

Population: 14,955 (1910 census).

Location: North of Lake Tahoe, on the eastern border of the State.

Nevada, one of the mountain counties of California, leads all others in its gold output for 1914, and stands sixth on the list in regard to the value of its total mineral output with a figure of \$3,329,179, as compared with the 1913 production, worth \$2,950,367.

While this county actually produces little else in the mineral line aside from gold and silver, its resources cover a wide scope, including antimony, asbestos, barytes, bismuth, chromite, clay, copper, gems, iron, lead, magnesite, mineral paint, pyrite, soapstone, and tungsten.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Copper -----	39 lbs.	\$5
Gems -----		60
Gold -----		3,300,000
Lead -----	145 lbs.	6
Miscellaneous stone -----		2,108
Silver -----		27,000
Total -----		\$3,329,179

Orange.

Area: 795 square miles.

Population: 34,436 (1910 census).

Location: Southwestern portion of State, bordering Pacific Ocean.

Orange County is one of the many in California which on casual inspection appears to be anything but a mineral-producing section. It stands, however, as the second county in the State in regard to the total value of mineral output, its highly productive oil fields making such a condition possible.

This county made a tremendous gain in 1914, with a total value of mineral products of \$8,831,763, over the 1913 output, worth \$6,948,495.

Aside from the substances actually produced and noted in the table below, coal, gypsum, iron, infusorial earth, sandstone, and tourmaline have been found in Orange County.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	1,333 M	\$19,300
Miscellaneous stone -----		88,315
Natural gas -----	1,867,336 M cu. ft.	112,040
Petroleum -----	12,758,678 bbls.	8,612,108
Total -----		\$8,831,763

Placer.

Area: 1,395 square miles.

Population: 18,237 (1910 census).

Location: Eastern border of State, directly west of Lake Tahoe.

While standing only nineteenth on the list of mineral-producing counties, Placer contains a wide variety of mineral substances which have never been commercially exploited. Its leading products are gold, granite, and limestone. Other mineral resources, many of them undeveloped, are: Asbestos, brick, chromite, clay, coal, copper, gems, gold, iron, lead, limestone, magnesite, manganese, marble, quartz crystals, glass-sand, silver, soapstone, and the stone industry.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	2,000 M	\$40,000
Clay -----	63,700 tons	49,000
Copper -----	453 lbs.	60
Gold -----		600,000
Lead -----	385 lbs.	15
Limestone -----	202,575 tons	202,575
Miscellaneous stone -----		203,593
Silver -----		4,500
Total -----		\$1,099,743

Plumas.

Area: 2,594 square miles.

Population: 5,259 (1910 census).

Location: Northeastern border of State, south of Lassen.

A considerable portion of the area of Plumas County lies in the high mountains, and deposits of the metals, especially gold and copper, are found here. Lack of transportation and other facilities have retarded its growth, but its future is decidedly promising. Mineral production for 1914 was valued at \$164,809, as compared with the 1913 output, worth \$143,698.

Among its mineral resources are: Chromite, copper, gold, granite, iron, lead, limestone, manganese, platinum minerals, silver, tungsten, and zinc.

In thirty-seventh place, commercial production for 1914 was as follows:

Substance	Amount	Value
Copper -----	150,000 lbs.	\$19,950
Gold -----		140,000
Lead -----	2,058 lbs.	80
Miscellaneous stone -----		1,879
Silver -----		2,900
Total -----		\$164,809

Riverside.

Area: 7,240 square miles.

Population: 34,696 (1910 census).

Location: Southern portion of State.

Riverside is the fourth county in the State in size and the seventeenth in regard to the total value of mineral output for 1914. Within its borders are included mountain, desert and agricultural land. Its

mineral resources include metals, structural and industrial materials, and salines, some of the more important being asbestos, borax, brick, cement, clay, coal, copper, gems, gold, graphite, gypsum, iron, lead, limestone, magnesite, marble, mineral paint, mineral water, nitre, salt, glass-sand, soapstone, silver, stone industry, and tin.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	1,610 M	\$36,713
Clay -----	70,136 tons	69,420
Copper -----	36,102 lbs.	4,802
Gold -----		10,000
Gypsum -----	5,300 tons	7,825
Mineral water -----	100,000 gals.	2,000
Miscellaneous stone -----		206,802
Silver -----		100
Other minerals -----		1,241,924
Total -----		\$1,579,586

Sacramento.

Area: 983 square miles.

Population: 90,000 (estimate of Chamber of Commerce, 1913).

Location: North central portion of State.

Sacramento stands tenth among the counties of the State as a mineral producer, the output, principally gold, for 1914 being valued at \$2,632,658, as compared with the 1913 production, worth \$2,925,706. In regard to gold output alone this county ranks fourth, being exceeded only by Nevada, Amador, and Yuba counties. Its mineral resources include: Brick, clay, gold, natural gas, platinum, silver, and the stone industry.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	22,862 M	\$160,923
Gold -----		2,175,000
Miscellaneous stone -----		253,235
Natural gas -----	80,000 M cu. ft.	40,000
Silver -----		3,500
Total -----		\$2,632,658

San Benito.

Area: 1,392 square miles.

Population: 8,041 (1910 census).

Location: West central portion of State.

Although twenty-seventh among the counties of the State in regard to value of total mineral production, San Benito leads in one important branch of the mineral industry, namely, quicksilver production.

Its other mineral resources, many of them undeveloped, include: Antimony, bituminous rock, chromite, coal, gypsum, gems, limestone, mineral water, soapstone, and the stone industry.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Mineral water -----	700 gals.	\$280
Miscellaneous stone -----		110,630
Quicksilver -----	6,633 flasks	325,349
Total -----		\$436,259

San Bernardino.

Area: 20,157 square miles.

Population: 75,000 (estimated by board of supervisors, 1913).

Location: Southeastern portion of State.

San Bernardino, by far the largest county in the State, ranks sixteenth as regards the value of its mineral output for 1914, with a total of \$1,614,606. This county, consisting largely of mountain and desert country, is highly mineralized, a few of the more important mineral resources being: Asbestos, barytes, borax, brick, cement, clay, copper, gems, gold, gypsum, iron, lead, limestone, marble, mineral paint, mineral water, nitre, potash, salt, glass-sand, silver, soapstone, soda, stone industry, tungsten, tuff, vanadium, and zinc.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	25 M	\$1,250
Copper -----	19,069 lbs.	2,536
Gold -----		205,000
Gypsum -----	17,332 tons	49,150
Lead -----	45,110 lbs.	1,759
Lime -----	84,637 bbls.	93,100
Limestone -----	23,006 tons	20,880
Mineral paint -----	80 tons	561
Mineral water -----	44,200 gals.	5,100
Miscellaneous stone -----		131,978
Salt -----	482 tons	2,892
Sand, glass -----	140 tons	400
Silver -----		40,000
Other minerals -----		1,060,000
Total -----		\$1,614,606

San Diego.

Area: 4,221 square miles.

Population: 140,000 (estimate by Chamber of Commerce, 1913).

Location: Extreme southwest corner of State.

San Diego, first in California in the production of gem stones, ranks thirtieth in the total value of its mineral output. This figure for 1914 equaled \$315,267, as compared to the 1913 output, worth \$315,694. Aside from minerals commercially produced, as shown below, San Diego County contains deposits of asbestos, bismuth, lithia mica, marble, potash, soapstone, and tungsten.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	5,457 M	\$56,392
Copper -----	30 lbs.	4
Gems -----		1,510
Mineral water -----	8,865 gals.	911
Miscellaneous stone -----		210,250
Salt -----	15,300 tons	46,200
Total -----		\$315,267

San Francisco.

Area: 43 square miles.

Population: 527,000 (estimated by Chamber of Commerce, 1915).

Surprising as it may appear at first glance, San Francisco County is listed among the mineral producing sections of the State, actual production consisting of crushed rock, sand, and gravel. Small quantities of various valuable mineral substances are found here, including cinabar, gypsum, lignite and magnesite, none, however, in paying quantities.

In forty-first place, commercial production for 1914 was as follows:

Substance	Value
Miscellaneous stone -----	\$119,889
Total -----	\$119,889

San Joaquin.

Area: 1,448 square miles.

Population: 50,731 (1910 census).

Location: Central portion of State.

San Joaquin County reported a mineral production for the year 1914 having a total value of \$129,930, as compared with the 1913 output, worth \$165,157. Comparatively few mineral substances are found here, the chief ones being brick, clay, infusorial earth, manganese, natural gas, glass-sand, and stone industry.

In fortieth place, commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	5,793 M	\$82,890
Manganese -----	150 tons	1,500
Miscellaneous stone -----		19,440
Natural gas -----	154,872 M	25,900
Other minerals -----		200
Total -----		\$129,930

San Luis Obispo.

Area: 3,334 square miles.

Population: 19,383 (1910 census).

Location: Bordered by Kern County on the east and the Pacific Ocean on the west.

The total value of the mineral production of San Luis Obispo County in 1914 was \$63,465, as compared with the 1913 output, worth \$63,675. Among its mineral resources, both developed and undeveloped, are: Asphalt, bituminous rock, brick, chromite, coal, copper, gold, gypsum, infusorial earth, limestone, marble, mineral water, onyx, petroleum, quicksilver, silver, and stone industry.

In forty-fifth place, commercial production for 1914 was as follows:

Substance	Amount	Value
Bituminous rock -----	579 tons	\$1,118
Mineral water -----	1,000 gals.	250
Quicksilver -----	1,266 flasks	62,097
Total -----		\$63,465

San Mateo.

Area: 447 square miles.

Population: 37,500 (estimate by county board of supervisors, 1913).

Location: Peninsula, adjoined by San Francisco on the north.

San Mateo's most important mineral products are limestone and salt, the latter being derived by evaporation from the waters of San Francisco Bay. The total value of all mineral production during 1914 equaled \$246,478, as compared with the 1913 figures of \$215,371.

Small amounts of barytes, chromite, infusorial earth and quicksilver have been discovered in addition to the items of economic value noted below.

In thirty-second place, commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	950 M	\$24,074
Gems -----		200
Lime -----	6,581 bbls.	845
Limestone -----	153,329 tons	75,941
Miscellaneous stone -----		34,648
Salt -----	27,500 tons	76,750
Sandstone -----	81,000 tons	34,020
Total -----		\$246,478

Santa Barbara.

Area: 2,740 square miles.

Population: 27,738 (1910 census).

Location: Southwestern portion of State, joining San Luis Obispo on the south.

Santa Barbara County owes its position as ninth in the State in regard to its mineral product to the presence of productive oil fields within its boundaries. The total value of its mineral production during the year 1914 was \$2,686,309, as compared with the 1913 output of \$3,636,288.

Aside from the mineral substances listed below, Santa Barbara County contains asphalt, diatomaceous earth, gilsonite, gypsum, magnesite, and quicksilver in more or less abundance.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Bituminous rock -----	25,000 tons	\$50,000
Brick -----	2,100 M	16,800
Limestone -----	6,157 tons	11,263
Mineral water -----	160,400 gals.	152,432
Miscellaneous stone -----		15,300
Natural gas -----	6,313,380 M cu. ft.	378,802
Petroleum -----	4,325,787 bbls.	1,989,862
Sandstone -----	9,286 cu. ft.	1,850
Other minerals -----		70,000
Total -----		\$2,686,309

Santa Clara.

Area: 1,328 square miles.

Population: 97,039 (estimate by Chamber of Commerce, 1913).

Location: West central portion of State.

Santa Clara County reported a mineral output for 1914 of \$266,956, as compared with the 1913 figures of \$311,383. This county, lying largely in the Coast Range of mountains, contains a wide variety of mineral substances, including brick, clay, limestone, magnesite, manganese, mineral water, petroleum, quicksilver, soapstone, and the stone industry. It stood second in quicksilver yield for the year.

In thirty-first place, commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	15,900 M	\$79,500
Magnesite -----	1,425 tons	14,250
Mineral water -----	29,000 gals.	10,750
Miscellaneous stone -----		39,093
Petroleum -----	10,000 bbls.	5,300
Quicksilver -----	2,407 flasks	118,063
Total -----		\$266,956

Santa Cruz.

Area: 435 square miles.

Population: 26,140 (1910 census).

Location: Bordering Pacific Ocean, just south of San Mateo County.

The mineral output of Santa Cruz County, a portion of which is itemized below, amounted to a total value of \$1,642,958, giving the county a standing of fifteenth among all others in the State in this regard.

Among the mineral resources known here are bituminous rock, cement, coal, graphite, gold, lime, limestone, petroleum, silver, and the stone industry.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Bituminous rock -----	40,540 tons	\$115,500
Lime -----	173,282 bbls.	157,011
Limestone -----	14,666 tons	25,082
Miscellaneous stone -----		4,276
Other minerals -----		1,341,089
Total -----		\$1,642,958

Shasta.

Area: 3,858 square miles.

Population: 18,920 (1910 census).

Location: North central portion of State.

Shasta County stands fourth in California among the mineral-producing counties, with an output valued at \$5,044,930, as compared with the 1913 production, worth \$6,212,344. Not taking petroleum into account, Shasta leads all the counties by a wide margin. This county is first in copper production, first in silver, first in pyrite, and seventh in gold. The Shasta copper belt is the most important deposit of this metal on the Pacific coast, and the present production would be practically doubled were it not for the conflict between the agricultural interests and the smelters regarding the alleged damage done to crops by the smelter fumes. Some of the smelters have been closed by injunction and others have been forced to curtail their output in the effort to render their gaseous waste innocuous.

Shasta's leading mineral resources are: Asbestos, barytes, brick, chrome, copper, gold, iron, lead, lime, limestone, mineral water, pyrite, silver, stone industry, and zinc.

Mount Lassen is located in southeastern Shasta County.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	1,594 M	\$10,223
Chromite -----	867 tons	4,884
Copper -----	25,122,766 lbs.	3,341,328
Gold -----		1,100,000
Iron -----	1,436 tons	5,128
Lead -----	21,565 lbs.	841
Lime -----	8,657 bbls.	5,163
Limestone -----	36,997 tons	30,026
Mineral water -----	30,000 gals.	6,850
Miscellaneous stone -----		125
Pyrite -----	69,438 tons	195,362
Silver -----		345,000
Total -----		\$5,044,930

Sierra.

Area: 923 square miles.

Population: 4,098 (1910 census).

Location: Eastern border of State, just north of Nevada County.

Sierra County reported a mineral production of \$733,000, consisting of gold and silver, during the year 1914, as compared with the 1913 output worth \$1,010,976. Considering gold output alone, this county stands tenth; and as to total mineral yield, twenty-fifth.

Aside from the metals itemized below, Sierra County contains deposits of asbestos, chromite, iron, lead, platinum minerals, serpentine and talc.

Commercial production for 1914 was as follows:

Substance	Value
Gold -----	\$730,000
Silver -----	3,000
Total -----	\$733,000

Siskiyou.

Area: 6,256 square miles.

Population: 18,800 (1910 census).

Location: Extreme north central portion of State, next Oregon boundary.

Siskiyou, fifth county in California in regard to size, located in a highly mineralized and mountainous country, ranks twenty-eighth in regard to the value of its mineral output for 1914. Although the county is traversed by a transcontinental railroad in a north and south

line, the mineral-bearing sections are almost without exception far from transportation and other facilities. A large part of the county is accessible by trail alone. Future development and exploitation will doubtless increase the productiveness of this part of the State to a great degree.

Among Siskiyou's mineral resources are: Chromite, clay, coal, copper, gems, gold, lead, limestone, marble, mineral water, pumice stone, quicksilver, sandstone, silver, and the stone industry.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Coal -----	100 tons	\$500
Gold -----		312,000
Lead -----	58 lbs.	2
Lime -----	677 bbls.	629
Mineral water -----	650,000 gals.	65,000
Miscellaneous stone -----		5,371
Sandstone -----	250 cu. ft.	150
Silver -----		1,100
Total -----		\$384,752

Solano.

Area: 822 square miles.

Population: 27,559 (1910 census).

Location: Touching San Francisco Bay on the northeast.

Solano, while mostly valley land, produced mineral substances during the year 1914 to the total value of \$1,683,866, ranking fourteenth among the counties of the State. Among her mineral resources are: Bituminous rock, brick, cement, clay, fuller's earth, limestone, mineral water, natural gas, onyx, petroleum, quicksilver, salt, and the stone industry.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Limestone -----	86,128 tons	\$86,128
Mineral water -----	43,020 gals.	5,208
Miscellaneous stone -----		71,288
Natural gas -----	5,357 M cu. ft.	5,546
Quicksilver -----	320 flasks	15,696
Other minerals -----		1,500,000
Total -----		\$1,683,866

Sonoma.

Area: 1,577 square miles.

Population: 48,394 (1910 census).

Location: South of Mendocino County, bordering on the Pacific Ocean.

Sonoma ranked twenty-ninth among the counties of California during the year 1914, with a mineral production of \$326,144, as compared with its 1913 output worth \$239,037. More paving blocks are manufactured here than in any other section of the State.

Among Sonoma's mineral resources are: Brick, chromite, clay, copper, graphite, infusorial earth, magnesite, marble, mineral paint, mineral water, quicksilver, and the stone industry.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Magnesite -----	213 tons	\$2,130
Mineral water -----	89,015 gals.	46,160
Miscellaneous stone -----		276,516
Quicksilver -----	13 flasks	638
Other minerals -----		700
Total -----		\$326,144

Stanislaus.

Area: 1,450 square miles.

Population: 35,000 (estimated by the county board of supervisors).

Location: Center of State, bounded on south by Merced County.

Gold is the chief mineral product of Stanislaus County, although brick, clay, gypsum, iron, manganese, mineral paint, quicksilver and silver are found here to some extent as well. This county, though apparently ranking forty-ninth in the State in regard to value of mineral output, is really in a higher position. In order not to reveal individual business, the gold and silver yield of its single dredge is combined with similar data under Merced County.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	250 M	\$2,500
Gold* -----		
Mineral paint -----	52 tons	286
Miscellaneous stone -----		3,096
Silver* -----		
Total -----		\$5,882

*Combined with Merced.

Sutter.

Area: 608 square miles.

Population: 6,329 (1910 census).

Location: Bounded by Butte County on the north and Sacramento on the south.

Sutter is one of only two counties in the State which reported no commercial output of some kind of mineral substance during 1914. Both clay and coal exist here, but deposits of neither mineral have been placed on a productive basis.

Tehama.

Area: 2,893 square miles.

Population: 11,401 (1910 census).

Location: North central portion of the State, bounded on the north by Shasta.

Tehama stands last among the fifty-six mineral-producing counties of the State. Its mineral output during 1914 was valued at \$300, as compared with the 1913 production worth \$2,442.

Among its mineral resources are listed: Brick, chromite, copper, gold, marble, mineral water, salt, silver, and the stone industry.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Mineral water -----	100 gals.	\$100
Salt -----	*1/11 ton	200
Total -----		\$300

*From mineral water.

Trinity.

Area: 3,166 square miles.

Population: 3,301 (1910 census).

Location: Northwestern portion of State.

Trinity, like Siskiyou County, requires transportation facilities to further the development of its many and varied mineral resources. Deposits of asbestos, barytes, chromite, copper, gold, mineral water, platinum, quicksilver, silver, and building stone are known here, but with the exception of gold, very little active production of these mineral substances is possible, as yet.

In twenty-fourth place, commercial output for 1914 was as follows:

Substance	Value
Gold -----	\$750,000
Mineral water -----	245
Silver -----	3,500
Total -----	\$753,745

Tulare.

Area: 4,856 square miles.

Population: 35,440 (1910 census).

Location: Bounded by Inyo on the east, Kern on the south, Fresno on the north.

Tulare stands thirty-eighth on the list of mineral-producing counties. Her mineral resources, among others, are: Brick, clay, copper, feldspar, graphite, gems, infusorial earth, magnesite, marble, natural gas, quartz, glass sand, soapstone, stone industry, zinc.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	6,838 M	\$47,507
Feldspar -----	2,830 tons	13,065
Marble -----	6 cu. ft.	30
Magnesite -----	9,650 tons	96,500
Miscellaneous stone -----		1,750
Quartz -----	1,250 tons	2,400
Total -----		\$161,252

Tuolumne.

Area: 2,190 square miles.

Population: 9,979 (1910 census).

Location: East central portion of State—Mother Lode district.

Tuolumne ranks twentieth among the counties of the State relative to its total value of mineral output. As a producer of marble its standing is first.

Chromite, clay, copper, gold, lead, limestone, marble, mineral paint, platinum, soapstone, silver, and the stone industry are the leading mineral resources.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Copper -----	45 lbs.	\$6
Gold -----		950,000
Lead -----	89 lbs.	3
Lime -----	63,331 bbls.	38,000
Limestone -----	16,707 tons	21,907
Marble -----	21,830 cu. ft.	38,202
Silver -----		11,000
Total -----		\$1,059,118

Ventura.

Area: 1,878 square miles.

Population: 18,347 (1910 census).

Location: Southwestern portion of State, bordering on Pacific Ocean.

Ventura is the twenty-first county in the State in respect to the value of its mineral production for 1914, the exact figure being \$1,000,729, as compared with the output for 1913 worth \$924,972.

The best grade of petroleum produced in the State is found here.

Among its other mineral resources are: Asphalt, borax, brick, clay, mineral water, natural gas, sandstone.

Commercial production for 1914 was as follows:

Substance	Amount	Value
Brick -----	449 M	\$3,102
Natural gas -----	100,000 M cu. ft.	6,000
Petroleum -----	943,929 bbls.	991,125
Sandstone -----	1,195 cu. ft.	502
Total -----		\$1,000,729

Yolo.

Area: 1,014 square miles.

Population: 13,926 (1910 census).

Location: Sacramento Valley, bounded by Sutter on the east and Colusa on the north.

The mineral production from Yolo County during the year 1914 consisted of 15 flasks of quicksilver, valued at \$736, ranking it in fifty-fourth place. Deposits of undetermined value of iron and sandstone have been discovered within the confines of this county.

Yuba.

Area: 639 square miles.

Population: 10,042 (1910 census).

Location: Lies west of Sierra and Nevada counties; south of Plumas.

Yuba is eighth of the fifty-six mineral-producing counties of the State, and is third in regard to gold output. Quicksilver and iron deposits have been located in this county, aside from the following commercial production as reported for the year 1914:

Substance	Value
Gold -----	\$2,800,000
Miscellaneous stone -----	14,895
Silver -----	6,000
Total -----	\$2,820,895

CHAPTER EIGHT.

MINING LAWS.

The fundamental Federal and California statutes governing mining, the California mine bell signals and forms of location notices are given herewith.

MINING BUREAU ACT.

Chapter 679.

[Stat., 1913.]

An act establishing a state mining bureau, creating the office of state mineralogist, fixing his salary and prescribing his powers and duties; providing for the employment of officers and employees of said bureau, making it the duty of persons in charge of mines, mining operations and quarries to make certain reports, providing for the investigation of mining operations, dealings and transactions and the prosecution for defrauding, swindling and cheating therein, creating a state mining bureau fund for the purpose of carrying out the provisions of this act and repealing an act entitled "An act to provide for the establishment, maintenance, and support of a bureau, to be known as the state mining bureau, and for the appointment and duties of a board of trustees, to be known as the board of trustees of the state mining bureau, who shall have the direction, management and control of said state mining bureau, and to provide for the appointment, duties, and compensation of a state mineralogist, who shall perform the duties of his office under the control, direction and supervision of the board of trustees of the state mining bureau," approved March 23, 1893, and all acts amendatory thereof and supplemental thereto or in conflict herewith.

[Approved June 16, 1913. In effect August 10, 1913.]

The people of the State of California do enact as follows:

SECTION 1. There is hereby created and established a state mining bureau. The chief officer of such bureau shall be the state mineralogist, which office is hereby created.

SEC. 2. It shall be the duty of the governor of the State of California and he is hereby empowered to appoint a citizen and resident of this state, having a practical and scientific knowledge of mining, to the office of state mineralogist. Said state mineralogist shall hold his office at the pleasure of the governor. He shall be a civil executive officer. He shall take and subscribe the same oath of office as other state officers. He shall receive for his services a salary of three hundred dollars (\$300) per month, to be paid at the same time and in the same manner as the salaries of other state officers. He shall also receive his necessary traveling expenses when traveling on the business of his office. He shall give bond for the faithful performance of his duties in the sum of ten thousand dollars (\$10,000), said bond to be approved by the governor of the State of California.

SEC. 3. Said state mineralogist shall employ competent geologists, field assistants, qualified specialists and office employees when necessary in the execution of his plans and operations of the bureau, and fix their compensation. The said employees shall be allowed their necessary traveling expenses when traveling on the business of said department and shall hold office at the pleasure of said state mineralogist.

SEC. 4. It shall be the duty of said state mineralogist to make, facilitate, and encourage, special studies of the mineral resources and mineral industries of the

state. It shall be his duty: to collect statistics concerning the occurrence and production of the economically important minerals and the methods pursued in making their valuable constituents available for commercial use; to make a collection of typical geological and mineralogical specimens, especially those of economic and commercial importance, such collection constituting the museum of the state mining bureau; to provide a library of books, reports, drawings, bearing upon the mineral industries, and sciences of mineralogy and geology, and arts of mining and metallurgy, such library constituting the library of the state mining bureau; to make a collection of models, drawings and descriptions of the mechanical appliances used in mining and metallurgical processes; to preserve and so maintain such collections and library as to make them available for reference and examination, and open to public inspection at reasonable hours; to maintain, in effect, a bureau of information concerning the mineral industries of this state, to consist of such collections and library, and to arrange, classify, catalogue, and index the data therein contained, in a manner to make the information available to those desiring it; to issue from time to time such bulletins as he may deem advisable concerning the statistics and technology of the mineral industries of this state.

SEC. 5. It is hereby made the duty of the owner, lessor, lessee, agent, manager or other person in charge of each and every mine, of whatever kind or character, within the state, to forward to the state mineralogist, upon his request, at his office not later than the thirtieth day of June, in each year, a detailed report upon forms which will be furnished showing the character of the mine, the number of men then employed, the method of working such mine and the general condition thereof, the total mineral production for the past year, and such owner, lessor, lessee, agent, manager or other person in charge of any mine within the state must furnish whatever information relative to such mine as the state mineralogist may from time to time require for the proper discharge of his official duties. Any owner, lessor, lessee, agent, manager or other person in charge of each and every mine, of whatever kind or character within the state, who fails to comply with the above provisions shall be deemed guilty of a misdemeanor.

SEC. 6. The state mineralogist now performing the duties of the office of state mineralogist shall perform the duties of the office of state mineralogist as in this act provided until the appointment and qualification of his successor as in this act provided.

SEC. 7. The said state mineralogist shall take possession, charge and control of the offices now occupied and used by the board of trustees and state mineralogist and the museum, library and laboratory of the mining bureau located in San Francisco as provided for by a certain act of the legislature approved March 23, 1893, and hereafter referred to in section 14 hereof, and shall maintain such offices, museum, library and laboratory for the purposes provided in this act.

SEC. 8. Said state mineralogist or qualified assistant shall have full power and authority at any time to enter or examine any and all mines, quarries, wells, mills, reduction works, refining works and other mineral properties or working plants in this state in order to gather data to comply with the provisions of this act.

SEC. 9. The state mineralogist shall make a biennial report to the governor on or before the fifteenth day of September next preceding the regular session of the legislature.

SEC. 10. All moneys received by the state mining bureau or any officer thereof (except such as may be paid to them by the state for disbursement) shall be receipted for by the state mineralogist or other officer authorized by him to act in his place and at least once a month accounted for by him to the state controller and paid into the state treasury to the credit of a fund which is hereby created and designated "state mining bureau fund." All moneys now in the possession of the state mining bureau or any officer thereof received from any source whatsoever, shall be immediately paid over to the state mineralogist and by him accounted for to the controller and paid into the state treasury to the credit of said fund. Said fund shall be used and is hereby appropriated for the use of said bureau in carrying out the purposes of this act.

SEC. 11. The said state mineralogist is hereby authorized and empowered to receive on behalf of this state, for the use and benefit of the state mining bureau, gifts, bequests, devises and legacies of real or other property and to use the same in accordance with the wishes of the donors, and if no instructions are given by said donors, to manage, use, and dispose of the gifts and bequests and legacies for the best interests of said state mining bureau and in such manner as he may deem proper.

SEC. 12. The state mineralogist may whenever he deems it advisable, prepare a special collection of ores and minerals of California to be sent to or used at any world's fair or exposition in order to display the mineral wealth of the state.

SEC. 13. The state mineralogist is hereby empowered to fix a price upon and to dispose of to the public, at such price, any and all publications of the state mining bureau, including reports, bulletins, maps, registers or other publications, such price shall approximate the cost of publication and distribution. Any and all sums derived from such disposition, or from gifts or bequests made, as hereinbefore provided must be accounted for by said state mineralogist and turned over to the state treasurer to be credited to the mining bureau fund as provided for in section 10. He is also empowered to furnish without cost to public libraries the publications of the bureau, and to exchange publications with other geological surveys and scientific societies, etc.

SEC. 14. The state mineralogist provided for by this act shall be the successor in interest of the board of trustees of the state mining bureau, and the state mineralogist, under and by virtue of that certain act, entitled "An act to provide for the establishment, maintenance, and support of a bureau, to be known as the state mining bureau, and for the appointment and duties of a board of trustees, to be known as the board of trustees of the state mining bureau, who shall have the direction, management, and control of said state mining bureau, and to provide for the appointment, duties, and compensation of a state mineralogist, who shall perform the duties of his office under the control, direction and supervision of the board of trustees of the state mining bureau," approved March 23, 1893, and all books, papers, documents, personal property, records, and property of every kind and description obtained or possessed, or held or controlled by the said board of trustees of the said state mining bureau, and the state mineralogist, and the clerks and employees thereof, under the provisions of said act of March 23, 1893, or any act supplemental thereto or amendatory thereof, shall immediately be turned over and delivered to the said state mineralogist herein provided for, who shall have charge and control thereof.

SEC. 15. That certain act entitled "An act to provide for the establishment, maintenance, and support of a bureau, to be known as the state mining bureau, and for the appointment and duties of a board of trustees, to be known as the board of trustees of the state mining bureau, and to provide for the appointment, duties and compensation of a state mineralogist, who shall perform the duties of his office under the control, direction, and supervision of the board of trustees of the state mining bureau," approved March 23, 1893, together with all acts amendatory thereof and supplemental thereto and all acts in conflict herewith are hereby repealed.

DEPARTMENT OF PETROLEUM AND GAS.

Chapter 718.

An act establishing and creating a department of the state mining bureau for the protection of the natural resources of petroleum and gas from waste and destruction through improper operations in production; providing for the appointment of a state oil and gas supervisor; prescribing his duties and powers; fixing his compensation; providing for the appointment of deputies and employees; providing for their duties and compensation; providing for the inspection of petroleum and gas wells; requiring all persons operating petroleum and gas wells to make certain reports; providing procedure for arbitration of departmental rulings; creating a fund for the purposes of the act; providing for assessment of charges to be paid by operators and providing for the collection thereof; and making an appropriation for the purposes of this act.

[Approved June 10, 1915.]

The people of the State of California do enact as follows:

SECTION 1. A separate department of the state mining bureau is hereby established and created to be known as the department of petroleum and gas. Such department shall be under the general jurisdiction of the state mineralogist. He shall appoint a supervisor who shall be a competent engineer or geologist experienced in the development and production of petroleum and who shall be designated the "state oil and gas supervisor," and whose term of office shall be four years from and after the date of his appointment.

SEC. 2. For his services in the general supervision of said department the state mineralogist shall receive as compensation one thousand four hundred dollars annually which shall be in addition to his compensation fixed in section two of the act of June 16, 1913, relating to the state mining bureau. The supervisor shall receive an annual salary of four thousand five hundred dollars, and shall be allowed his necessary traveling expenses. The state mineralogist may appoint necessary clerks, stenographers, and assistants, and prescribe their duties and fix their compensation, within the amount limited in section forty-six hereof and subject to the civil service laws of the state.

The additional salary herein authorized to be paid to the state mineralogist and the salaries of the supervisor and of the deputies, clerks, stenographers, assistants and other employees shall be paid out of the funds hereinafter provided for at the times and in the manner that salaries of other state officers and employees are paid.

SEC. 3. It shall be the duty of the state oil and gas supervisor so to supervise the drilling, operation and maintenance and abandonment of petroleum or gas wells in the State of California, as to prevent, as far as possible, damage to underground petroleum and gas deposits from infiltrating water and other causes and loss of petroleum and natural gas.

SEC. 4. It shall be the duty of the state oil and gas supervisor to appoint not more than four deputies and prescribe their duties, and fix their compensation. Such deputies shall serve during the pleasure of the supervisor. He may also employ an attorney and fix his compensation. The supervisor, the deputies, and the attorney shall not be subject to the civil service act.

SEC. 5. Each deputy appointed by the supervisor shall be a competent engineer or geologist experienced in the development and production of petroleum. Each deputy shall be assigned certain districts or territory, and shall maintain an office in the district, convenient of access to the petroleum or gas operators therein. The office shall be open and the deputy shall be present at certain specified times which shall be posted at such office.

SEC. 6. It shall be the duty of each deputy, to collect all necessary information regarding the oil wells in the district, with a view to determining the presence and source of water in the oil sand, and to make all maps and other accessories necessary

to determine the presence and source of water in the oil sands. This work shall be done with the view to advising the operators as to the best means of protecting the oil and gas sands, and with a view to aiding the supervisor in ordering tests or repair work at wells. All such data shall be kept on file in the office of the deputy oil and gas supervisor of the respective district.

SEC. 7. The records of any and all operators, when filed with the deputy supervisor as hereinafter provided, shall be open to inspection to those authorized in writing by such operators, to the state officers, and to the board of arbitration hereinafter provided for. Such records shall in no case be available as evidence in court proceedings and no officer or employee or member of any board of arbitration shall be allowed to give testimony as to the contents of said records, except at such court proceedings as are hereinafter provided for in the review of the decision of the state oil and gas supervisor, or a board of arbitration, and in criminal proceedings arising out of such records, or the statements upon which they are based.

SEC. 8. It shall be the duty of the supervisor to order such tests or remedial work as is in his judgment necessary to protect the petroleum and gas deposits from damage by underground water, to the best interest of the neighboring property owners and the public at large. The order shall be in written form, signed by the supervisor, and served upon the owner of the well or his local agent, in the manner provided in section eleven hereof. The order shall specify the work necessary to protect such deposits from damage from underground waters. For this purpose each operator or owner shall designate an agent, giving his post office address, who resides within the county where the well or wells are located, upon whom all orders and notices provided for in this act may be served.

SEC. 9. The well owner, or his local agent, may within ten days from date of service of order from the supervisor, file with the supervisor, or his deputy in the district where the property is located, a statement that the supervisor's order is not acceptable and that arbitration of the subject is demanded.

SEC. 10. Arbitration of a question which has been the subject of an order by the supervisor shall be accomplished by a board of three members, as follows: (1) The owner of the well or his local agent shall name one member who shall not be directly or indirectly interested in the property, nor employed in its operation. (2) The owners, or their local agents, of wells within a radius of one mile from the affected well, shall name one member of the arbitration board, who shall not be directly or indirectly interested in the property nor employed in its operation. For this purpose the supervisor shall give written notice to each of the said owners or agents. The notice shall specify the time and place of meeting and the fact that it is for the purpose of choosing an arbitrator. The notice shall be published once in a newspaper of general circulation, published in the county where the meeting is to be held, and posted in a conspicuous place at the office of the deputy supervisor at least five days before the time of meeting, and a copy thereof mailed to each of such owners, or their local agents, at the address given, at least five days before the time of meeting. A majority of those attending such meeting shall be sufficient to choose such arbitrator. (3) The third member of the arbitration board shall be chosen by the other members, but if they fail to choose a third member within ten days after the selection of the first two members then such third member shall be chosen by the state mineralogist, and shall not be directly or indirectly interested in the property, nor employed in its operation. The arbitrators chosen as above specified shall each be paid ten dollars per day for each day of actual service, not to exceed thirty dollars each for any one case, upon warrants drawn upon the repair fund hereinafter created, and approved by the state mineralogist. One-half of the cost of arbitration shall be paid by the person demanding it and the board of arbitration may, at its discretion, order that the entire cost of such arbitration shall be paid by such person if it finds that such arbitration has been demanded needlessly or not in good faith.

SEC. 11. Upon receipt by the supervisor or deputy supervisor of a written complaint, signed by one-third of the individuals or corporations owning land or operating wells within a radius of one mile of any well, or group of wells, the supervisor

must make an investigation of said well or wells and render a written order stating the work required to repair the damage complained of, or stating that no work is required. A copy of such order must be delivered to each of the complainants and, if the supervisor order the damage repaired, a copy of such order shall be delivered to each of the owners, or agents, having in charge the wells upon which the work is to be done. Service of such copies shall be by mailing to such persons at the post office address given. Within ten days after the date of mailing of such order any of such complainants may demand arbitration of the matter as provided in section 10 of this act. When said complaint is made by a single party against a well or wells, of which there is no financially responsible owner, the supervisor may order the necessary repair work, the expense of which shall be a charge against the complainant collectible as provided in section fourteen.

SEC. 12. In any proceedings before the board of arbitration herein provided for, the supervisor shall have the power to subpoena witnesses and to administer oaths; *provided, however*, that no person shall be required to attend upon such subpoenas, either with or without books, papers, documents or accounts, unless residing within the same county or within thirty miles of the place of attendance, but the supervisor may in such a case cause the deposition of witnesses residing within or without the state, to be taken in the manner prescribed by law for like depositions in civil actions in the superior courts of this state, and to that end may compel the attendance of witnesses and the production of books, papers, and documents at such places as he may designate within the limits hereinbefore prescribed. Witnesses shall be entitled to receive the fees and mileage fixed by law in civil cases. In case of failure on the part of any person to comply with any order of the supervisor, or any subpoena, or upon the refusal of any witness to testify to any matter regarding which he may lawfully be interrogated before the board, it shall be the duty of the superior court or the judge thereof, on application of the supervisor, to compel obedience in the same manner, by contempt proceedings or otherwise, that such obedience would be compelled in a proceeding pending before the court.

SEC. 13. Within ten days after hearing the evidence the arbitration board shall make a written decision ordering such tests or remedial work as is deemed necessary to protect the oil sands from damage by infiltrating water. This written decision shall be served upon the owner or his agent and shall supersede and nullify the previous order of the supervisor provided for in section eight hereof. In case no written decision is made by a board of arbitration within thirty days after the date of notice by the supervisor, as provided in section ten hereof, the order of the supervisor shall be effective and subject only to review by writ of certiorari from the superior court as provided in section fourteen hereof.

SEC. 14. On or before thirty days after the date of serving an order of the supervisor provided for in section eight hereof, or, in case of arbitration, on or before thirty days after date of serving the decision of the board, as provided in sections twelve and thirteen hereof, the owner shall commence in good faith the work ordered, and continue until completion. If the work has not been so commenced and continued to completion the supervisor shall appoint agents as he deems necessary, who shall enter the premises and perform the work. Accurate account of all such expenditures shall be kept and the amount paid from the fund hereinafter created upon the warrant of the state controller. Any amounts so expended shall constitute a lien against the property upon which the work is done. The decision of the board of arbitration or of the supervisor in such a case may be reviewed by writ of certiorari from the superior court of the county in which the disrict is situated, if taken within thirty days after the signing of the order. If no review is taken or, if taken, the decision of the board is affirmed, the lien upon the property shall be enforced in the same manner that other liens on real property are enforced and shall first be enforced against the owner of the well, against the operator and against the personal property and fixtures used in the construction or operation thereof, and then if there then be any deficiency, against the land upon which the work is done.

SEC. 15. It shall be the duty of the owner of any well now drilled, or that may be drilled, in the State of California, on lands producing or reasonably presumed to contain petroleum or gas, to properly case such well or wells, with metal casing, in

accordance with methods approved by the supervisor, and to use every effort and endeavor in accordance with the most approved methods to effectually shut off all water overlying or underlying the oil or gas-bearing strata, and to effectually prevent any water from penetrating such oil or gas-bearing strata.

SEC. 16. It shall be the duty of the owner of any well referred to in this act, before abandoning the same, to use every effort and endeavor in accordance with methods approved by the supervisor, to shut off and exclude all water from entering oil-bearing strata encountered in the well. The owner shall give written notice to the supervisor, or his local deputy, of his intention to abandon any well and the date when such work of abandonment shall begin. The notice shall be given to the supervisor, or his local deputy, at least fifteen days before such proposed abandonment. The owner shall furnish the supervisor, or his deputy, with such information as he may request, showing the condition of the well and proposed method of abandonment. The supervisor, or his deputy, shall before the proposed date of abandonment furnish the owner with a written order of approval of his proposal or a written order stating what work will be necessary before approval, to abandon, will be given. If the supervisor shall fail within the specified time to give the owner a written order such failure shall be considered as an approval of the owner's proposal to abandon the well.

SEC. 17. The owner of any well referred to in this act shall, before commencing the work of drilling an oil or gas well, file with the supervisor, or his local deputy, a written notice of intention to commence drilling. Such notice shall also contain the following information: (1) Statement of location and elevation above sea level of proposed derrick and drill rig. (2) The number or other designation by which such well shall be known, which number or designation shall not be changed after filing notice provided for in this section, without the written consent of the supervisor being obtained therefor. (3) The owner's estimate of the depth of the point at which water shall be shut off. (4) The owner's estimate of the depth at which oil or gas producing sand or formation shall be encountered. The provisions of this section shall also apply, so far as may be, to the deepening or redrilling of any well.

SEC. 18. It shall be the duty of the owner of any well referred to in this act, to keep a careful and accurate log of the drilling of such well, such log to show the character and depth of the formations passed through or encountered in the drilling of such well, and particularly to show the location and depth of the water-bearing strata, together with the character of the water encountered from time to time (so far as ascertained) and to show at what point such water was shut off, if at all, and if not, to so state in such log, and show completely the amounts, kinds and size of casing used, and show the depth at which oil-bearing strata is encountered, the depth and character of same, and whether all water overlying and underlying such oil-bearing strata was successfully and permanently shut off so as to prevent the percolation or penetration into such oil-bearing strata; such log shall be kept in the local office of the owner or operator and subject to the inspection of the supervisor or any of his deputies at any time during business hours, and a copy of said log shall be filed with the deputy supervisor immediately upon the completion of said well and also a complete copy shall be filed with the deputy supervisor upon the completion of any additional work upon the well. The owner of any well drilled previous to the enactment of this act shall furnish to the supervisor a complete and correct log of such well, so far as may be possible, together with a statement of the present condition of said well.

SEC. 19. It shall be the duty of the owner of any well referred to in this act to notify the deputy supervisor of the time at which the owner shall test the shut-off of water in any such well. Such notice shall be given at least five days before such test. The deputy supervisor shall be present at such test and shall himself note in the log book the result thereof. If any test shall be unsatisfactory to him he shall notify the owner of that fact.

SEC. 20. It shall be the duty of every person, association or corporation, producing oil in the State of California, to file with the supervisor at his request but not oftener than once in each month a sworn statement of the amount of oil

produced, during the period indicated, its gravity and the number of wells drilling, producing, idle, or abandoned. This information shall be in such form as the supervisor may designate.

SEC. 21. Any owner or operator of a well referred to in this act, or employee thereof, who refuses to permit the supervisor, or his deputy, to inspect the same, or who wilfully hinders or delays the enforcement of this act, and every person, firm, or corporation, who violates any provision of this act, is guilty of a misdemeanor and shall be punishable by a fine of not less than one hundred dollars, or by imprisonment in the county jail for not less than thirty days, or by both such fine and imprisonment.

SEC. 22. Charges levied, assessed and collected as hereinafter provided upon the properties of every person, firm, corporation or association operating any oil well or wells for the production of petroleum in this state, or operating any well or wells for the production of natural gas in this state which gas wells are situate in counties having producing petroleum wells chargeable under this act, and on lands situate within two miles, as near as may be, of any petroleum or gas well the production of which is chargeable under this act, shall be used exclusively for the support and maintenance of the department of petroleum and gas hereinbefore created, and shall be assessed and levied by the state mineralogist, and collected in the manner hereinafter provided.

SEC. 23. Every person, firm, corporation or association operating any petroleum well or wells in this state shall annually pay a charge to the state treasurer at a uniform rate per barrel of petroleum produced for the preceding calendar year at the time and in the manner hereinafter provided, based upon a verified report as herein provided.

SEC. 24. Every person, firm, corporation or association operating any gas well or wells in this state shall annually pay a charge to the state treasurer based upon the amount of gas sold in the preceding calendar year at a fixed rate per thousand cubic feet, which rate shall be based upon the proportionate benefits resulting to the property so assessed by reason of the expenditures made under this act, in the county, in which each such well is located. Said charge shall be based upon a verified report as herein provided; *provided, further*, that no charges shall be assessed, levied, or collected from any person, firm, corporation, or association operating a gas well or wells in any county in which there exist no producing petroleum wells to be assessed under the provisions of this act.

SEC. 25. Every person, firm, corporation or association owning any oil land, as determined by the supervisor, shall annually pay a charge to the state treasurer at the time and in the manner hereinafter provided, which charge shall be a uniform rate per acre. Said charge shall be based upon a verified report as provided herein; *provided, however*, that such lands so assessed shall not be called upon to pay more than one-tenth of the total charges or moneys proposed to be assessed, levied and collected under the provisions of this act for any one year.

SEC. 26. The charges assessed, levied and to be collected under the provisions of this act shall be in addition to any and all charges, taxes, assessments or licenses of any kind or nature paid by or upon the properties assessed hereunder.

SEC. 27. The state mineralogist shall annually, on or before the first Monday in March, acting in conjunction with the state board of control, make an estimate of the amount of moneys which shall be required to carry out the provisions of this act.

SEC. 28. The state mineralogist shall prescribe the form and contents of all reports for making the charge or other purposes to carry out the intent and provisions of this act, which form shall be mailed in duplicate to the person, firm, corporation or association owning property or assessed under the provisions of this act.

SEC. 29. Every person, firm, corporation or association chargeable under the provisions of this act, shall within ten days after the first Monday in March of each year, report to and file with the state mineralogist, a report in such form as said officer may prescribe, giving any and all items of information as may be demanded by said report, and necessary to carry out the provisions of this act, which

report shall be verified by such person or officer as the state mineralogist may designate.

SEC. 30. If any person, firm, corporation or association chargeable under the provisions of this act shall fail or refuse to furnish the state mineralogist within the time prescribed in this act the verified report provided for in this act, the state mineralogist must note such failure or refusal in the record of assessments hereinafter in this act provided for, and must make an estimate of the petroleum or gas production, or landed area to be assessed of any such person, firm, corporation or association and must assess the same at the amount thus estimated and compute the charge thereon, which assessment and charge shall be the assessment and charge for such year. And if in the succeeding year any such person, firm, corporation or association shall again fail and refuse to furnish the verified report required by this act, the state mineralogist shall make an estimate as aforesaid, which estimate shall not be less than twice the amount of the estimate made by him for the previous year, and shall note such failure or refusal as above provided, and the said estimate so made shall be the assessment or charge for said year. In case of each succeeding consecutive failure or refusal the said state mineralogist shall follow the same procedure until a true statement or report shall be furnished.

SEC. 31. Any person, firm, corporation or association failing or refusing to make and furnish any report prescribed in this act or rendering a false or fraudulent report shall be guilty of a misdemeanor and subject to a fine of not less than three hundred dollars and not exceeding one thousand dollars for each such offense.

SEC. 32. The state mineralogist may, for good cause shown, by order entered upon his minutes, extend for not exceeding thirty days, the time fixed in this act for filing any report herein provided for.

SEC. 33. On or before the third Monday before the first Monday in July the state mineralogist shall determine the rate or rates which, when applied to the assessments provided for in this act, shall produce the sum necessary to be raised as provided in section twenty-seven of this act. Within the same time the said state mineralogist shall extend in the proper column of the record of assessments hereinafter provided for the amount of charges due from each person, firm, corporation or association.

SEC. 34. Between the first Monday in March and the third Monday before the first Monday in July in each year, the state mineralogist must assess and levy the charges as and in the manner provided for in this act. The assessments must be made to the person, firm, corporation or association owning or operating the property subject to assessment hereunder on the first Monday in March. If the name of the owner is unknown to the state mineralogist, such assessment must be made to unknown owners. Clerical errors occurring or appearing in the name of any person, firm, corporation or association whose property is properly assessed and charged, or in the making, or extension of any assessment or charge upon the records, which do not affect the substantial rights of the payer, shall not invalidate the assessment or charge.

SEC. 35. The state mineralogist and the chairman of the state board of control and the chairman of the state board of equalization shall constitute a board of review, correction and equalization, and shall have all the powers and perform such duties as usually devolve upon a county board of equalization under the provisions of section three thousand six hundred seventy-two of the Political Code. The state mineralogist shall act as secretary of said board, and shall keep an accurate minute of the proceedings thereof. Said board of review, correction and equalization shall meet at the state capitol on the third Monday before the first Monday in July of each year, and remain in session from day to day until the first Monday in July for the purpose of carrying out the provisions of this section.

SEC. 36. On the third Monday before the first Monday in July of each year the state mineralogist shall cause to be published a notice, one or more times, in a daily, or weekly, or semi-weekly newspaper of general circulation published in the counties of Fresno, Kern, Los Angeles, Orange, Ventura and Santa Barbara, if one be published therein, otherwise in a newspaper of general circulation published in the

county nearest to such county designated herein in which no such paper is published, that the assessment of property and levy of charges under and in pursuance of this act has been completed and that the records of assessments containing the charges due will be delivered to the state controller on the first Monday in July, and that if any person, firm, corporation or association is dissatisfied with the assessment made or charge fixed by the state mineralogist, he or it may, at any time before said first Monday in July, apply to said board of review, correction and equalization to have the same corrected in any particular. The said board shall have power at any time before said first Monday in July to correct the record of assessments and may increase or decrease any assessment or charge therein if in its judgment the evidence presented or obtained warrants such action. Costs of such publication in any county shall be paid from the repair fund of said county.

SEC. 37. The state mineralogist must prepare each year a book, in one or more volumes, to be called the "Record of Assessments and Charges for Oil Protection," in which must be entered, either in writing or printing, or both writing and printing, each assessment and levy or charge made by him upon the property provided to be assessed and charged under this act, describing the property assessed, and such assessments may be classified and entered in such separate parts of said record as said state mineralogist shall prescribe.

SEC. 38. On the first Monday in July the state mineralogist must deliver to the state controller the record of assessments and charges for oil protection, certified to by said state mineralogist, which certificate shall be substantially as follows: "I, -----, state mineralogist, do hereby certify that between the first Monday in March and the first Monday in July, 19__, I made diligent inquiry and examination to ascertain all property and persons, firms, corporations and associations subject to assessment for the purpose of oil protection as required by the provisions of the act of legislature approved -----, 19__, providing for the assessment and collection of charges for oil protection; that I have faithfully complied with all the duties imposed upon me by law; that I have not imposed any unjust or double assessment through malice or ill will, or otherwise; nor allowed any person, firm, corporation or association, or property to escape a just assessment or charge through favor or regard, or otherwise."

But the failure to subscribe such certificate to such record of assessments and charges for oil protection, or any certificate, shall not in any manner affect the validity of any assessment or charge.

It is the intention of this act that in the assessment of the lands as provided in section twenty-five hereof, and in carrying such assessments to the record of assessments aforesaid, the state mineralogist shall keep within two miles as near as may be of producing petroleum or gas wells as provided in said section twenty-five hereof.

SEC. 39. The charges levied and assessed under the provisions of this act shall be due and payable on the first Monday in July in each year, and one-half thereof shall be delinquent on the sixth Monday after the first Monday in July at six o'clock p.m. and unless paid prior thereto, fifteen per cent shall be added to the amount thereof, and unless paid prior to the first Monday in February next thereafter at six o'clock p.m., an additional five per cent shall be added to the amount thereof, and the unpaid portion, or the remaining one-half of said charges shall become delinquent on the first Monday in February next succeeding the day upon which they become due and payable, at six o'clock p.m.; and if not paid prior thereto five per cent shall be added to the amount thereof.

SEC. 40. Within ten days after the receipt of the record of assessments and charges for oil protection, the state controller must begin the publication of a notice to appear daily for five days, in one daily newspaper of general circulation published in each of the counties of Fresno, Kern, Los Angeles, Orange, Ventura and Santa Barbara, if one be published therein, otherwise for at least two times in a weekly or semi-weekly paper of general circulation published therein, or if there be neither a daily, nor weekly nor semi-weekly paper of general circulation published in any one of such counties, then the publication of the notice for such county shall be made in a similar manner in a newspaper of general circulation published in the county nearest such county, specifying:

(1) That he has received from the state mineralogist the record of assessments and charges for oil protection.

(2) That the charges therein assessed and levied are due and payable on the first Monday in July and that one-half thereof will be delinquent on the sixth Monday after the first Monday in July at six o'clock p.m., and that unless paid to the state treasurer at the capitol prior thereto, fifteen per cent will be added to the amount thereof, and unless paid prior to the first Monday in February next thereafter at six o'clock p.m., an additional five per cent will be added to the amount thereof; and that the remaining one-half of said charges will become delinquent on the first Monday in February next succeeding the day upon which they become due and payable, at six o'clock p.m.; and if not paid to the state treasurer at the capitol prior thereto, five per cent will be added to the amount thereof. Costs of such publication in any county shall be paid from the repair fund of said county.

SEC. 41. The assessments and charges levied under the provisions of this act shall constitute a lien upon all the property of every kind and nature belonging to the persons, firms, corporations, and associations and assessed under the provisions hereof, which lien shall attach on the first Monday in March of each year. Every charge and assessment herein provided for has the effect of a judgment against the person, firm, corporation or association, and every lien created by this act has the effect of an execution duly levied against all property of the delinquent; the judgment is not satisfied nor the lien removed until such charges, penalties, and costs are paid, or the property sold for the payment thereof.

SEC. 42. All charges assessed and levied under the provisions of this act shall be paid to the state treasurer upon the order of the state controller. The controller must mark the date of payment of any charge on the record of assessments and charges for oil protection, and shall give a receipt for such payment in such form as the controller shall prescribe. Errors appearing in any assessment on said record of assessments or overcharges shall be corrected by the controller by and with the consent of the state board of control in such manner as said controller and said board shall agree upon.

SEC. 43. Any person, firm, corporation or association claiming and protesting as herein provided that the assessment made or charges assessed against him or it by the state mineralogist is void, in whole or in part, may bring an action against the state treasurer for the recovery of the whole or any part of such charge, penalties, or costs paid on such assessment upon the grounds stated in said protest, but no action may be brought later than the third Monday in February next following the day on which the charges were due, nor unless such person, firm, corporation or association shall have filed with the state controller at the time of payment of such charges a written protest stating whether the whole assessment or charge is claimed to be void, or if a part only, what part, and the grounds upon which such claim is founded; and when so paid under protest the payment shall in no case be regarded as voluntary.

Whenever, under the provisions of this section, an action is commenced against the state treasurer, a copy of the complaint and of the summons must be served upon the treasurer, or his deputy. At the time the treasurer demurs or answers, he may demand that the action be tried in the superior court of the county of Sacramento, which demand must be granted. The attorney general must defend the action, or may appoint any competent attorney to so defend, the expense of which employment shall be paid from the repair fund raised under the provisions of this act. The provisions of the Code of Civil Procedure relating to pleadings, proofs, trials, and appeals are applicable to the proceedings herein provided for.

A failure to begin such action within the time herein specified shall be a bar against the recovery of such charges. In any such action the court shall have the power to render judgment for plaintiff for any part or portion of the charge, penalties, or costs found to be void and so paid by plaintiff upon such assessment.

SEC. 44. The state controller shall, on or before the thirtieth day of May next following the delinquency of any charge as provided in this act, bring an action in a court of competent jurisdiction in the county of Sacramento in the name of the people of the State of California, to collect any delinquent charges or assessments,

together with any penalties, or costs, which have not been paid in accordance with the provisions of this act and appearing delinquent upon the records of assessments and charges for oil protection hereinbefore in this act provided for.

The attorney general, or some competent attorney appointed by him for that purpose, must prosecute such action, and the provisions of the Code of Civil Procedure relating to service of summons, pleadings, proofs, trials, and appeals are applicable to the proceedings herein provided for. In such action a writ of attachment may be issued, and no bond or affidavit previous to the issuing of said attachment is required. The special attorney herein authorized to be appointed to prosecute such action or actions shall be paid from the repair funds raised under the provisions of this act.

Payment of the charges and penalties, or amount of the judgment recovered in such action must be made to the state treasurer. In such actions the record of assessment and charges for oil protection, or a copy of so much thereof as is applicable in said action, duly certified by the controller, showing unpaid charges against any person, firm, corporation or association assessed by the state mineralogist, is prima facie evidence of the assessment upon the property, the delinquency, the amount of charges, penalties, and costs due and unpaid to the state, and that the person, firm, corporation or association is indebted to the people of the State of California in the amount of charges and penalties therein appearing unpaid, and that all the forms of law in relation to the assessment of such charges have been complied with.

SEC. 45. The first assessment under the provisions of this act shall be as of the first Monday in March, nineteen hundred sixteen, and the reports of petroleum production and sales of gas herein provided to be assessed shall be reported for the calendar year ending December thirty-first, nineteen hundred fifteen. The lands herein provided to be assessed and charged shall be assessed to the owners thereof as of the first Monday in March, nineteen hundred sixteen.

SEC. 46. All of the moneys paid to the state treasurer under this act shall be deposited to the credit of the "oil protection fund" which is hereby created. Of the moneys in such funds forty-five thousand dollars only, shall be set aside as a "supervision account" and shall be available annually for the support and maintenance of the department herein established, and for the necessary expenses of the controller in carrying out the provisions of this act. Any balance remaining in said account at the end of any fiscal year shall be carried over and made a part of the succeeding year's "supervision account"; *provided further*, that in the first assessment under this act, an amount equal to the sum appropriated in section fifty-one hereof, shall be added to the regular supervision account and also the amount of ten thousand dollars which shall be available for providing offices and equipment for the deputy supervisors. All moneys shall be drawn from such fund, for the purpose of this act, upon warrants drawn by the controller of the state, upon demands made by the state mineralogist, and audited by the state board of control.

SEC. 47. The moneys in such fund shall be expended under the direction of the state mineralogist. All moneys over and above the forty-five thousand dollars for support and maintenance shall be available for the actual repair of wells as specified in section fourteen, and for expenditures provided for in sections thirty-six, forty, forty-three and forty-four of this act. Moneys collected from any county shall be available for repair work only in said county. Expenditure on repair work, in any county, during one year, shall not exceed an amount equal to twenty-five dollars per producing oil well in said county, but in no county shall the amount exceed twenty-five thousand dollars, and the charges hereinbefore provided for shall be so determined that such amount shall be available. All moneys received in repayment for repair work done under the order and direction of the supervisor, as hereinbefore provided, shall be returned to the repair fund of the county in which the work was done.

SEC. 48. On or before the first day of October in each and every year, the supervisor shall submit a report in writing to the state mineralogist showing the total number of barrels of petroleum produced in each county in the state during the previous fiscal year, together with the total cost for said year of supervision as

shown by the "supervision account" and the net amount remaining therein available for the succeeding year's expense, also the total amount uncollected; such report shall also show the total amount collected in each county under the "County Repair Account" during such year, total amount expended for said purpose, the total amount still outstanding and not repaid, and the sum available for the next succeeding year. Such report shall also include such other information as the supervisor may deem advisable. The state mineralogist shall make public such statements promptly after receipt of the same from the supervisor for the benefit of all parties interested therein.

SEC. 49. All leases, licenses and assignments thereof or of any interest therein for, upon or concerning lands or tenements in this state, whereby a right is given or granted to operate or to sink or drill wells thereon for petroleum or gas, or either, or pertaining thereto; shall be filed for record forthwith, and recorded in the records of the county recorder of the county where the property is situated without delay, and not be removed until recorded. No such lease or license shall have any force or validity until it is filed for record as aforesaid, except as between parties thereto, unless the person claiming thereunder is in actual possession.

SEC. 50. Whenever the term "supervisor" is used in this act it shall be taken to mean the "state oil and gas supervisor," the term "oil" shall include "petroleum," the term "petroleum" shall include "oil," the term "gas" shall mean natural gas coming from the earth, the term "operator" shall mean any person, firm or corporation drilling, maintaining, operating, pumping, or in control of a well in any territory which the supervisor determines to be oil or gas producing territory, the term "owner" shall include "operator" when any oil or gas well is operated or has been operated or is about to be operated by any person, firm or corporation other than the owner thereof, and the term "operator" shall include "owner" when any such well is or has been or is about to be operated by or under the direction of the owner, except that all the provisions of this act relating to assessments for the purposes of this act based upon the annual production of oil or petroleum or sale of gas, as set forth in sections twenty-two to forty-five, inclusive of this act, shall apply only to a person, firm or corporation operating an oil or petroleum or gas well, and shall not apply to the owner of such well if some person, firm or corporation, other than such owner, has been actually operating the well during the whole period for which such annual charge is made, but in the event that the actual operation of any such well changes hands during such period, the charge shall be apportioned upon the basis of the oil or petroleum or gas produced, and the lien provided for in section forty-one of this act shall be a lien against the property of each and all such operators.

SEC. 51. There is hereby appropriated out of any moneys in the state treasury, not otherwise appropriated, the sum of twenty thousand dollars which said sum shall be immediately transferred by the state controller on the books of his office from the general fund to the "oil protection fund" created by section forty-six of this act.

The above mentioned fund shall be available for the uses of the state mineralogist for the maintenance of the department of petroleum and gas and for the necessary expenses of the controller in carrying out the provisions of this act. When the collections paid to the state treasurer, as herein provided, equal the sum of thirty thousand dollars then said sum of twenty thousand dollars shall be re-transferred from the oil protection fund to the general fund. The moneys received into the state treasury through the provisions of this act are hereby appropriated for the uses and purposes herein specified.

SEC. 52. If any section, subsection, sentence, clause or phrase of this act is for any reason held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this act. The legislature hereby declares that it would have passed this act, and each section, subsection, sentence, clause, and phrase thereof, irrespective of the fact that any one or more other sections, subsections, sentences, clauses, or phrases be declared unconstitutional.

SEC. 53. This act shall be liberally construed to meet its purposes and the supervisor shall have all powers which may be necessary to carry out the purposes

of this act, but the provisions of this act shall not apply to any land or wells situated within the boundaries of an incorporated city where the drilling of oil wells is prohibited.

SEC. 54. That certain act entitled "An act to prevent injury to oil, gas or petroleum-bearing strata or formations by the penetration or infiltration of water therein," approved March 20, 1909, together with all acts amendatory thereof and supplemental thereto and all acts in conflict herewith are hereby repealed. Nothing herein shall be construed as affecting the provisions of the act of June 16, 1913, establishing a state mining bureau.

TO PREVENT WASTING OF NATURAL GAS.

An act prohibiting the unnecessary wasting of natural gas into the atmosphere; providing for the capping or otherwise closing of wells from which natural gas flows; and providing penalties for violating the provisions of this act.

[Approved March 25, 1911.]

The people of the State of California, represented in senate and assembly, do enact as follows:

SECTION 1. All persons, firms, corporations and associations are hereby prohibited from wilfully permitting any natural gas wastefully to escape into the atmosphere.

SEC. 2. All persons, firms, corporations or associations digging, drilling, excavating, constructing or owning or controlling any well from which natural gas flows shall upon the abandonment of such well, cap or otherwise close the mouth of or entrance to the same in such a manner as to prevent the unnecessary or wasteful escape into the atmosphere of such natural gas. And no person, firm, corporation or association owning or controlling land in which such well or wells are situated shall wilfully permit natural gas flowing from such well or wells, wastefully or unnecessarily to escape into the atmosphere.

SEC. 3. Any person, firm, corporation or association who shall wilfully violate any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not more than one thousand dollars or by imprisonment in the county jail for not more than one year, or by both such fine and imprisonment.

SEC. 4. For the purposes of this act each day during which natural gas shall be wilfully allowed wastefully or unnecessarily to escape into the atmosphere shall be deemed a separate and distinct violation of this act.

SEC. 5. All acts or parts of acts in conflict herewith are hereby repealed.

SEC. 6. This act shall take effect immediately.

CALIFORNIA STATUTES.

LOCATION OF MINING CLAIMS, MILL SITES, AND ASSESSMENT WORK.

An act to amend the Civil Code of California by adding a new title thereto, to be numbered title X, in part IV of division second, consisting of sections 1426, 1426a, 1426b, 1426c, 1426d, 1426e, 1426f, 1426g, 1426h, 1426i, 1426j, 1426k, 1426l, 1426m, 1426n, 1426o, 1426p, 1426q, 1426r, and 1426s, providing for the manner of locating lode and placer mining claims, tunnel rights, mill sites, and prescribing the character and amount of assessment work on mining claims, and providing for proofs of such work, and for the recordation of location notices, and proof of labor, and for the enforcement of contributions from delinquent co-owners of mining claims, and prescribing the duties of county recorders respecting the recording of location notices of, and proofs of labor on, mining claims, tunnel rights, and mill sites, and the fees to be charged therefor, and repealing acts in conflict herewith.

[Approved March 13, 1909.]

The people of the State of California, represented in senate and assembly, do enact as follows:

SECTION 1. The Civil Code of the State of California is hereby amended by adding a new title thereto, to be numbered title X, in part IV of second division, consisting of sections 1426, 1426a, 1426b, 1426c, 1426d, 1426e, 1426f, 1426g, 1426h, 1426i, 1426j, 1426k, 1426l, 1426m, 1426n, 1426o, 1426p, 1426q, 1426r, and 1426s, to read as follows:

§ 1426. Any person, a citizen of the United States, or who has declared his intention to become such, who discovers a vein or lode of quartz, or other rock in place bearing gold, silver, cinnabar, lead, tin, copper, or other valuable deposit, may locate a claim upon such vein or lode, by defining the boundaries of the claim, in the manner hereinafter described, and by posting a notice of such location, at the point of discovery, which notice must contain:

First—The name of the lode or claim.

Second—The name of the locator or locators.

Third—The number of linear feet claimed in length along the course of the vein, each way from the point of discovery, with the width on each side of the center of the claim, and the general course of the vein or lode, as near as may be.

Fourth—The date of location.

Fifth—Such a description of the claim by reference to some natural object, or permanent monument, as will identify the claim located.

§ 1426a. The locator must define the boundaries of his claim so that they may be readily traced, and in no case shall the claim extend more than fifteen hundred feet along the course of the vein or lode, nor more than three hundred feet on either side thereof, measured from the center line of the vein at the surface.

§ 1426b. Within thirty days after the posting of his notice of location upon a lode mining claim, the locator shall record a true copy thereof in the office of the county recorder of the county in which such claim is situated, for which service the county recorder shall receive a fee of one dollar.

§ 1426c. The location of a placer claim shall be made in the following manner: By posting thereon, upon a tree, rock in place, stone, post or monument, a notice of location, containing the name of the claim, name of locator or locators, date of location, number of feet or acreage claimed, such a description of the claim by reference to some natural object or permanent monument as will identify the claim located, and by marking the boundaries so that they may be readily traced; *provided*, that where the United States survey has been extended over the land embraced in the location, the claim may be taken by legal subdivisions and no other reference than those of said survey shall be required and the boundaries of a claim so located and described need not be staked or monumented. The description by legal subdivisions shall be deemed the equivalent of marking.

§ 1426d. Within thirty days after the posting of the notice of location of a placer claim, the locator shall record a true copy thereof in the office of the county

recorder of the county in which such claim is situated, for which service the recorder shall receive a fee of one dollar.

§ 1426e. The locator of a tunnel right or location, shall locate his tunnel right or location by posting a notice of location at the face or point of commencement of the tunnel, which must contain:

First—The name of the locator or locators.

Second—The date of the location.

Third—The proposed course or direction of the tunnel.

Fourth—A description of the tunnel, with reference to some natural object or permanent monument as shall identify the claim or tunnel right.

§ 1426f. The boundary lines of the tunnel shall be established by stakes or monuments placed along the lines at an interval of not more than six hundred feet from the face or point of commencement of the tunnel to the terminus of three thousand feet therefrom.

§ 1426g. Within thirty days after the posting of the notice of location of the tunnel right or location, the locator shall record a true copy thereof, in the office of the county recorder of the county in which such claim is situated, for which service the recorder shall receive a fee of one dollar.

§ 1426h. If at any time the locator of any mining claim heretofore or hereafter located, or his assigns, shall apprehend that his original location notice was defective, erroneous, or that the requirements of the law had not been complied with before filing; or in case the original notice was made prior to the passage of this act, and he shall be desirous of securing the benefit of this act, such locator, or his assigns, may file an additional notice, subject to the provisions of this act; *provided*, that such amended location notice does not interfere with the existing rights of others at the time of posting and filing such amended location notice, and no such amended location notice or the record thereof, shall preclude the claimant, or claimants from proving any such title as he or they may have held under previous locations.

§ 1426i. Where a locator, or his assigns, has the boundaries and corners of his claim established by a United States deputy mineral survey, or a licensed surveyor of this state, and his claim connected with the corner of the public or minor surveys of an established initial point, and incorporates into the record of the claim, the field notes of such survey, and attaches to and files with such location notice a certificate of the surveyor, setting forth: *first*, that said survey was actually made by him, giving the date thereof; *second*, the name of the claim surveyed and the location thereof; *third*, that the description incorporated in the declaratory statement is sufficient to identify; such survey and certificate becomes a part of the record, and such record is prima facie evidence of the facts therein contained.

§ 1426j. The proprietor of a vein or lode claim or mine, or the owner of a quartz mill or reduction works, or any person qualified by the laws of the United States, may locate not more than five acres of non-mineral land as a mill site. Such location shall be made in the same manner as hereinbefore required for locating placer claims.

§ 1426k. The locator of a mill site claim or location shall, within thirty days from the date of his location, record a true copy of his location notice with the county recorder of the county in which such location is situated, for which service the recorder shall receive a fee of one dollar.

§ 1426l. The amount of work done or improvements made during each year to hold possession of a mining claim shall be that prescribed by the laws of the United States, to wit: One hundred dollars annually.

§ 1426m. Whenever [a] mine owner, company, or corporation shall have performed the labor and made the improvements required by law upon any mining claim, the person in whose behalf such labor was performed or improvements made, or some one in his behalf, shall within thirty days after the time limited for performing such labor or making such improvements make and have recorded by the county recorder, in books kept for that purpose, in the county in which such mining claim is situated, an affidavit setting forth the value of labor or improvements made, the name of the claim, and the name of the owner or claimant of said claim at whose expense the same was made or performed. Such affidavit, or a copy thereof, duly

certified by the county recorder, shall be prima facie evidence of the performance of such labor or the making of such improvements, or both.

§ 1426n. For recording the affidavit herein required, the county recorder shall receive a fee of fifty cents.

§ 1426o. Whenever a co-owner or co-owners of a mining claim shall give to a delinquent co-owner or co-owners the notice in writing or notice by publication provided for in section 2324, Revised Statutes of the United States, an affidavit of the person giving such notice, stating the time, place, manner of service, and by whom and upon whom such service was made, shall be attached to a true copy of such notice, and such notice and affidavit must be recorded in the office of the county recorder, in books kept for that purpose, in the county in which the claim is situated, within ninety days, after the giving of such notice; for the recording of which said recorder shall receive the same fees as are now allowed by law for recording deeds; or if such notice is given by publication in a newspaper, there shall be attached to a printed copy of such notice an affidavit of the printer or his foreman, or principal clerk of such paper, stating the date of the first, last and each insertion of such notice therein, and where the newspaper was published during that time, and the name of such newspaper. Such affidavit and notice shall be recorded as aforesaid, within one hundred and eighty days after the first publication thereof. The original of such notice and affidavit, or a duly certified copy of the record thereof, shall be prima facie evidence that the delinquent mentioned in section 2324 has failed or refused to contribute his proportion of the expenditure required by that section, and of the service of publication of said notice; *provided*, the writing or affidavit herein-after provided for is not of record. If such delinquent shall, within the ninety days required by section 2324, aforesaid, contribute to his co-owner or co-owners, his proportion of such expenditures, and also all costs of service of the notice required by this section, whether incurred for publication charges, or otherwise, such co-owner or co-owners shall sign and deliver to the delinquent or delinquents a writing stating that the delinquent or delinquents by name has within the time required by section 2324 aforesaid, contributed his share for the year -----, upon the ----- mine, and further stating therein the district, county and state wherein the same is situated, and the book and page where the location notice is recorded, if said mine was located under the provisions of this act; such writing shall be recorded in the office of the county recorder of said county, for which he shall receive the same fees as are now allowed by law for recording deeds. If such co-owner or co-owners shall fail to sign and deliver such writing to the delinquent or delinquents within twenty days after such contribution, the co-owner or co-owners so failing as aforesaid shall be liable to the penalty of one hundred dollars, to be recovered by any person for the use of the delinquent or delinquents in any court of competent jurisdiction. If such co-owner or co-owners fail to deliver such writing within said twenty days, the delinquent, with two disinterested persons having personal knowledge of such contribution, may make affidavit setting forth in what manner, the amount of, to whom, and upon what mine, such contribution was made. Such affidavit, or a record thereof, in the office of the county recorder of the county in which such mine is situated, shall be prima facie evidence of such contribution.

§ 1426p. The record of any location of a mining claims, mill site or tunnel right, in the office of the county recorder, as herein provided shall be received in evidence, and have the same force and effect in the courts of the state as the original notice.

§ 1426q. Copies of the records of all instruments required to be recorded by the provisions of this act, duly certified by the recorder, in whose custody such records are, may be read in evidence, under the same circumstances and rules as are now, or may be hereafter provided by law, for using copies of instruments relating to real estate, duly executed or acknowledged or proved and recorded.

§ 1426r. The provisions of this act shall not in any manner be construed as affecting or abolishing any mining district or the rules and regulations thereof within the State of California.

§ 1426s. The failure or neglect of any locator of a mining claim to perform development work of the character, in the manner and within the time required by

the laws of the United States, shall disqualify such locators from relocating the ground embraced in the original location or mining claim or any part thereof under the mining laws, within three years after the date of his original location and any attempted relocation thereof by any of the original locators shall render such location void.

SEC. 2. All acts and parts of acts in conflict with this act, are hereby repealed.

SEC. 3. This act shall take effect and be in force on and after July 1, 1909.

STATE SCHOOL LANDS.

Act 2227 (General Laws). This act provides that public lands of California, Secs. 16 and 36, are open to mineral entry under the usual mining law provisions.

MINING CORPORATIONS.

An act to repeal Title XI of Part IV of Division First of the Civil Code and each and every section of said title, and to substitute a new Title XI to take the place thereof in said code, relating to mining corporations.

[Approved March 21, 1905.]

The people of the State of California, represented in senate and assembly, do enact as follows:

SECTION 1. Title XI and Part IV of Division First of the Civil Code and each and every section of said title are hereby repealed, and a new Title XI is substituted in place thereof in said code, to read as follows:

TITLE XI.

MINING CORPORATIONS.

SEC. 586. Transfer agencies.

587. Stock issued at transfer agencies.

587a. Consolidation of mining corporations.

588. Books and balance sheets to be kept by secretary. Stockholders' right to inspect.

589. Right of stockholders to visit mine with expert.

590. Liability of presidents and directors.

§ 586. Any corporation organized in this state for the purpose of mining or carrying on mining operations in or without this state, may establish and maintain agencies in other states of the United States, for the transfer and issuing of their stock; and a transfer or issue of the same at any such transfer agency, in accordance with the provisions of its by-laws, is valid and binding as fully and effectually for all purposes as if made upon the books of such corporation at its principal office within this state. The agencies must be governed by the by-laws and the directors of the corporation.

§ 587. All stock of any such corporation, issued at a transfer agency, must be signed by the president and secretary of the corporation, and countersigned at the time of its issue by the agent having charge of the transfer agency. No stock must be issued at a transfer agency unless the certificate of stock, in lieu of which the same is issued, is at the time surrendered for cancellation.

§ 587a. It is lawful for two or more corporations formed, or that may hereafter be formed, under the laws of this state, for mining purposes, which own or possess mining claims or lands adjoining each other, or lying in the same vicinity, to consolidate their capital stock, debts, property, assets and franchises, in such manner and upon such terms as may be agreed upon by the respective boards of directors or trustees of such corporations so desiring to consolidate their interests; but no such consolidation must take place without the written consent of the stockholders representing two-thirds of the capital stock of each corporation, and no such consolidation can, in any way, relieve such corporations, or the stockholders thereof, from any and all just liabilities; and in case of such consolidation, due notice of the same must be given, by advertising, for one month, in at least one newspaper in the

county where the said mining property is situated, if there is one published therein, and also in one newspaper published in the county where the principal place of business of any of said corporation is. And when the consolidation is completed, a certificate thereof, containing the manner and terms of such consolidation, must be filed in the office of the county clerk of the county in which the original certificate of incorporation of each of said corporations is filed, and a copy thereof must be filed in the office of the secretary of state; such certificate must be signed by a majority of each board of trustees or directors of the original corporations, and it is their duty to call, within thirty days after the filing of such certificate, a meeting of the stockholders of all of said corporations so consolidated, to elect a board of trustees or directors for the consolidated corporation, for the year thence next ensuing; and to cause notice of the time and place fixed for such meeting to be mailed to each stockholder of each of such corporations at his last known place of residence or business at least ten days before the time fixed for such meeting. The said certificate must also contain all the requirements prescribed by section two hundred and ninety.

§ 588. It is the duty of the secretary of every corporation formed for the purpose of mining, or conducting mining in California, whether such corporation be formed and organized under the laws of the State of California or of any other state, territory, or foreign country, to keep at some place within the State of California an office and in such office to keep a complete set of books showing all receipts and expenditures of such corporation, the sources of such receipts, and the objects of such expenditures, and also all transfers of stock. All books and papers must, at all times during business hours, be open to the inspection of any stockholder. He is entitled to be accompanied by an expert, and to make copies or extracts from any such books or papers. He may, at reasonable hours, examine such mining property, accompanied by an expert, take samples, and make such other examination as he may deem necessary. It is the duty of the directors, on the second Monday of each and every month, to cause to be made an itemized account or balance sheet for the previous month, embracing a full and complete statement of all disbursements and receipts, showing from what sources such receipts were derived, and to whom and for what object or purpose such disbursements or payments were made; also all indebtedness or liabilities incurred or existing at the time, and for what the same were incurred, and the balance of money, if any, on hand. Such account or balance sheet must be verified under oath by the president and secretary, and posted in some conspicuous place in the office of the company. It is the duty of the superintendent, on the first Monday of each month, to file with the secretary an itemized account, verified under oath, showing all receipts and disbursements made by him for the previous month, and for what said disbursements were made. Such account must also contain a verified statement showing the number of men employed under him, and for what purpose, and the rate of wages paid to each. He must attach to such account a full and complete report, under oath, of the work done in said mine, the amount of ore extracted, from what part of mine taken, the amount sent to mill for reduction, its assay value, the amount of bullion received, the amount of bullion shipped to the office of the company or elsewhere, and the amount, if any, retained by the superintendent. It is his duty to forward to the office of the company a full report, under oath, of all discoveries of ores or mineral-bearing quartz made in said mine, whether by boring, drifting, sinking, or otherwise, together with the assay value thereof. All accounts, reports, and correspondence from the superintendent must be kept in some conspicuous place in the office of said company, open to the inspection of all stockholders.

§ 589. Any stockholder of a corporation formed under the laws of this state for the purpose of mining, is entitled to visit, accompanied by his expert, and examine the mine or mines owned by such corporation, and every part thereof, at any time he may see fit; and when such stockholder applies to the president of such corporation, he must immediately cause the secretary thereof to issue and deliver to such applicant an order, under the seal of the corporation, directed to the superintendent, commanding him to show and exhibit such parts of said mine or mines as the party

named in said order may desire to visit and examine. It is the duty of the superintendent, on receiving such order, to furnish such stockholder every facility for making a full and complete inspection of said mine or mines, and of the workings therein, and to accompany said stockholder either in person, or to furnish some person familiar with said mine or mines to accompany him in his visit to and through such mine or mines, and every part thereof. If the superintendent fails to obey such order, such stockholder is entitled to recover, in any court of competent jurisdiction, against the corporation, the sum of one thousand dollars, and traveling expenses to and from the mine, as liquidated damages, together with costs of suit. In case of such refusal, it is the duty of the directors of the corporation forthwith to remove the officer so refusing, and thereafter he must not be employed directly or indirectly by the corporation, nor must any salary be paid to him.

§ 590. In case of the refusal or neglect of the president to cause to be issued by the secretary the order mentioned in section five hundred and eighty-nine, such stockholder is entitled to recover against said president the sum of one thousand dollars and costs, as provided in the last section. If the directors fail to have the reports and accounts current made and posted as provided in section five hundred and eighty-eight, they are liable, either severally or jointly, to an action by any stockholder complaining thereof, and on proof of such refusal or failure, he may recover judgment for actual damages sustained by him, with costs of suit. Each of such defaulting directors is also liable to removal for such neglect.

CORPORATION LICENSE TAX LAW.

Chapter 190.

An act prescribing terms and conditions upon which corporations may transact business in this state and providing penalties and forfeitures for non-compliance.

[Approved May 10, 1915.]

The people of the State of California do enact as follows:

SECTION 1. Every corporation organized under the laws of another state, territory, or of a foreign country, which is now doing business in this state or maintaining an office herein, and which has not filed with the secretary of state prior to the day on which this act takes effect the document or documents required by section four hundred and eight of the Civil Code, or which shall hereafter do business in this state or maintain an office herein, or which shall enter this state for the purpose of doing business herein, must file in the office of the secretary of state of the State of California a certified copy of its articles of incorporation, or of its charter, or of the statute or statutes, or legislative, or executive, or governmental act or acts creating it, in cases where it has been created by charter, or statute, or legislative, or executive, or governmental act, duly certified by the secretary of state or other officer authorized by the law of the jurisdiction under which such corporation is formed to certify such copy, and must also file a certified copy thereof, duly certified by the secretary of state of this state in the office of the county clerk of the county where its principal place of business in this state is located, and also where such corporation owns any property, and every such corporation shall pay to the secretary of state for filing in his office such certified copy of its articles of incorporation, or of its charter, or of the statute or statutes, or legislative, or executive, or governmental act or acts creating it, a fee of seventy-five dollars, which fee shall be in lieu of the filing fee provided for in section four hundred and nine of the Political Code; *provided*, that foreign corporations organized for educational, religious, scientific or charitable purposes and having no capital stock, shall pay a fee of five dollars for filing the document or documents hereinabove required.

Foreign corporations having a capital stock shall also file with the secretary of state copies of any documents showing an increase or decrease in their authorized

capital stock, which documents shall be certified in the manner hereinabove required, but no fee shall be paid for such filing. It is hereby provided that every foreign corporation subject to the tax herein provided shall file with the secretary of state, at the time it tenders payment of said tax and any penalty which has accrued, an affidavit sworn to by its president or secretary, showing the amount of its authorized capital stock on the first day of January of the year in which said payment is made, and in the event that such authorized capital stock, as shown by such affidavit, differs from the amount of such capital stock as appears from the records of the secretary of state, then the tax herein provided shall be measured by the amount shown in such affidavit, but in such event the license herein required shall not be issued nor shall the amount so tendered be accepted until copies of any documents relating to such change in authorized capital stock, certified as required by this section, shall have been filed with the secretary of state. If such corporation shall neglect to file such copy or copies before the hour of six o'clock p.m. of the first Monday of February of the year for which the license must be procured, it shall suffer the penalty for the delinquency herein provided and if it shall neglect to make such filing before the hour of six o'clock p.m. of the Saturday preceding the first Monday in March of such year, it shall suffer the forfeiture provided in section seven of this act; *provided, however*, that any foreign corporation which, prior to the eighth day of March, nineteen hundred and one, shall have complied with the provisions of the act entitled, "An act to amend 'An act in relation to foreign corporations,' approved April first, eighteen hundred and seventy-two," approved March seventeenth, eighteen hundred and ninety-nine, shall, in lieu of the provisions of this section above set forth, file the affidavit herein required and the license tax due from such corporation shall be measured by the authorized capital stock, as shown thereby.

SEC. 2. Upon filing in the office of the secretary of state the certified copy of articles of incorporation of corporations organized under the laws of this state, there shall be paid to the secretary of state the fees prescribed therefor by section four hundred and nine of the Political Code.

SEC. 3. No corporation heretofore or hereafter incorporated under the laws of this state, or of any other state, territory, or foreign country, shall do or attempt to do any intrastate business within this state by virtue of its charter, or certificate of incorporation, without a state license therefor.

SEC. 4. It shall be the duty of every corporation incorporated under the laws of this state, and of every corporation incorporated under the laws of any other state, territory, or foreign country, now doing intrastate business within this state, or which shall hereafter engage in intrastate business in this state, to procure annually from the secretary of state a license authorizing the transaction of such business in this state, and to pay therefor the license tax prescribed herein.

For the purpose of measuring said tax the secretary of state shall examine all articles of incorporation and all documents on file in his office relating to an increase or decrease in the authorized capital stock of corporations which are subject to said tax, and determine the amount due from each corporation by the following rule:

When the authorized capital stock of the corporation does not exceed ten thousand dollars (\$10,000.00) the tax shall be ten dollars (\$10.00); when the authorized capital stock exceeds ten thousand dollars (\$10,000.00) but does not exceed twenty thousand dollars (\$20,000.00) the tax shall be fifteen dollars (\$15.00); when the authorized capital stock exceeds twenty thousand dollars (\$20,000.00) but does not exceed fifty thousand dollars (\$50,000.00) the tax shall be twenty dollars (\$20.00); when the authorized capital stock exceeds fifty thousand dollars (\$50,000.00) but does not exceed one hundred thousand dollars (\$100,000.00) the tax shall be twenty-five dollars (\$25.00); when the authorized capital stock exceeds one hundred thousand dollars (\$100,000.00) but does not exceed two hundred and fifty thousand dollars (\$250,000.00) the tax shall be fifty dollars (\$50.00); when the authorized capital stock exceeds two hundred and fifty thousand dollars (\$250,000.00), but does not exceed five hundred thousand dollars (\$500,000.00) the tax shall be seventy-five dollars (\$75.00); when the

authorized capital stock exceeds five hundred thousand dollars (\$500,000.00) but does not exceed one million dollars (\$1,000,000.00) the tax shall be one hundred dollars (\$100.00); when the authorized capital stock exceeds one million dollars (\$1,000,000.00) but does not exceed three million dollars (\$3,000,000.00) the tax shall be two hundred dollars (\$200.00); when the authorized capital stock exceeds three million dollars (\$3,000,000.00) but does not exceed five million dollars (\$5,000,000.00) the tax shall be three hundred and fifty dollars (\$350.00); when the authorized capital stock exceeds five million dollars (\$5,000,000.00) but does not exceed seven million five hundred thousand dollars (\$7,500,000.00) the tax shall be five hundred fifty dollars (\$550.00); when the authorized capital stock exceeds seven million five hundred thousand dollars (\$7,500,000.00) but does not exceed ten million dollars (\$10,000,000.00) the tax shall be eight hundred dollars (\$800.00); when the authorized capital stock exceeds ten million dollars (\$10,000,000.00) the tax shall be one thousand dollars (\$1,000.00). All corporations having no capital stock, but organized for profit, shall pay an annual tax of ten dollars (\$10.00). Said license tax shall be due and payable to the secretary of state on the first day of January of each and every year. Such license tax shall be paid on or before the hour of six o'clock p.m. of the first Monday of February of each year and if not so paid shall at said hour become delinquent and there shall thereupon be added thereto as a penalty for such delinquency the sum of ten dollars (\$10.00).

SEC. 5. The license hereby provided authorizes the corporation holding the same to transact intrastate business in this state during the year or any fractional part of such year for which such license is issued. "Year," within the meaning of this act, means from and including the first day of January to and including the thirty-first day of December next thereafter.

SEC. 6. At the time of filing any certified copy of articles of incorporation, or charter, or statute or statutes, or legislative, or executive or governmental act or acts creating a corporation, when filed between the first day of January and the thirty-first day of December, inclusive, in any year, there shall be paid to the secretary of state, in addition to all other fees required by law, that proportion of the license tax specified in section four of this act which the unexpired number of months of such year bears to the entire year including the month in which such filing occurs, and thereupon the secretary of state shall issue a license for such fractional part of the then current year.

SEC. 7. At the hour of six o'clock p.m. of the Saturday preceding the first Monday in March of each year the charters of all corporations organized under the laws of this state and which have failed to pay the license tax and penalty prescribed by section four of this act shall be forfeited to the State of California, and the right of all foreign corporations to do intrastate business in this state, which have failed to pay said license tax and penalties shall be likewise forfeited.

SEC. 8. Educational, religious, scientific and charitable corporations, corporations which are not organized for profit, and corporations doing solely an interstate business and those corporations enumerated in subdivisions (a), (b) and (c) of section fourteen of article XIII of the constitution are exempt from the payment of the tax provided by this act.

SEC. 9. Any corporation claiming exemption from the payment of said annual license tax must file with the secretary of state at least sixty days before such tax becomes due and payable a written protest in which it shall set forth all facts and reasons upon which such exemption claim is made, sworn to by the president and secretary or general manager of such corporation. Failure to protest in the manner and within the time herein prescribed shall constitute a waiver of all rights of exemption from said tax. Such corporation shall furnish under oath such other proof as the secretary of state may require or demand. All evidence and proofs submitted upon such claim of exemption shall be submitted by the secretary of state to the board of control and state controller, and said officers shall thereupon determine the question of such corporation's claim of exemption. The determination of said officers upon all questions of fact shall be final and conclusive; *provided, however*, that at the time of filing a certified copy of the articles of incorporation of any domestic corporation in the office of the secretary of state, and at the time a

foreign corporation files with the secretary of state the document or documents required by section one of this act, the secretary of state shall determine whether such corporation is exempt as an educational, religious, scientific, or charitable corporation or as a non-profit corporation or as one of the corporations enumerated in subdivisions (a), (b) and (c) of section fourteen of article XIII of the constitution.

SEC. 10. If the license tax and penalties for delinquency required to be paid by section four of this act are not paid within the time herein required, the secretary of state shall on the Saturday preceding the first Monday in March, and at six o'clock p.m. of said day, enter upon the record of corporations in his office against the name of any company so failing to pay said license tax and penalty the words "charter forfeited to the state," if the corporation be a domestic corporation, and thereupon said charter shall be *ipso facto* so forfeited, and the words "right to do intrastate business forfeited" if the corporation be a foreign corporation, and thereupon said right to do intrastate business in this state shall be *ipso facto* so forfeited.

SEC. 11. On or before the first Monday of April of each year the secretary of state shall make a list of all domestic corporations whose charters have been so forfeited, and of all foreign corporations whose right to do intrastate business in this state has been so forfeited or which have surrendered their right to do intrastate business in this state as provided in section fifteen of this act, and shall transmit a certified copy thereof to each county clerk in this state, who shall file the same in his office.

SEC. 12. It shall be unlawful for any corporation, either domestic or foreign, which has not paid the license tax, as in this act prescribed, to exercise the powers of such corporation, or to transact any intrastate business in this state, after six o'clock p.m. of the Saturday preceding the first Monday in March next following the delinquency. Each and every person who exercises any of the powers of a corporation which has forfeited its charter or right to do intrastate business in this state, or who transacts any business for or in behalf of such corporation, after such forfeiture, shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than one hundred dollars and not exceeding one thousand dollars, or by imprisonment in the county jail not less than fifty days or more than five hundred days, or by both such fine and imprisonment.

SEC. 13. In all cases of forfeiture under the provisions of this act, the directors or managers in office of the affairs of any domestic corporation, whose charter may be so forfeited, or of any foreign corporation whose right to do business in this state may be so forfeited, are deemed to be trustees of the corporation and stockholders or members of the corporation whose power or right to do business is forfeited and have full power to settle the affairs of the corporation and to maintain or defend any action or proceeding then pending in behalf of or against any of said corporations, or to take such legal proceedings as may be necessary to fully settle the affairs of said corporation, and such directors or managers, as such trustees, may be sued in any of the courts of this state by any person having a claim against any of said corporations; *provided, always*, that no action pending against any corporation shall abate thereby, but may be prosecuted to final judgment and may be enforced by execution with the same force and effect and in like manner as though no forfeiture had occurred; *and provided, further*, that where judgment has been entered against any corporation prior to forfeiture under this act, that notwithstanding, execution may be issued thereon and the property of said corporation, or that may come into the hands of any trustees for it may be levied upon, seized and sold to satisfy the same with like force and effect as though such forfeiture had not occurred.

SEC. 14. Any domestic corporation which suffers the forfeiture prescribed by this act, may pay to the secretary of state all taxes and penalties which shall have accrued prior to such forfeiture, and all taxes and penalties which would have accrued if such forfeiture had not occurred; and shall file an application with the secretary of state for the restoration of its charter, which application must set forth the names of the persons who became trustees upon such forfeiture, under the provisions of section thirteen of this act, and shall be signed by all of said persons then surviving, and acknowledged by each of said persons before an officer authorized by

the laws of this state to take acknowledgments of conveyances of real property; whereupon such corporation shall be restored to its former corporate status and the secretary of state shall issue to such corporation a license entitling it to transact intrastate business in this state during the year in which such license is issued; *provided, however*, that no corporation organized under the laws of this state which suffers such forfeiture shall be relieved from the effect thereof, nor shall such license be issued, in the event that subsequent to the date of forfeiture its corporate name, or a name so closely resembling said name as will tend to deceive, has been adopted and is in use by another domestic corporation.

Any foreign corporation which suffers a forfeiture of its right to do intrastate business in this state, may pay to the secretary of state all taxes and penalties which shall have accrued prior to such forfeiture, and all taxes and penalties which would have accrued if such forfeiture had not occurred, and shall file with the secretary of state its application for a restoration of its right to do intrastate business, and copies of any documents increasing or decreasing its capital stock, certified as hereinbefore provided, together with an affidavit by its president or secretary, setting forth the amount of its authorized capital stock on the first day of January of the year in which said application is presented, and the taxes which would have accrued after the date of such forfeiture shall be measured by the authorized capital stock, as shown by such copies and affidavits; whereupon such corporation shall be restored to its former corporate status and the secretary of state shall issue to such corporation a license entitling it to do intrastate business in this state during the year in which such license is issued.

Any domestic corporation which has heretofore suffered a forfeiture of its charter under the provisions of an act entitled "An act relating to revenue and taxation, providing for a license tax upon corporations and making an appropriation for the purpose of carrying out the objects of this act," approved March 20, 1905, or under the provisions of any act amendatory thereof, may be restored to its former corporate status, subject to and upon complying with the conditions hereinabove provided for the reinstatement of domestic corporations which suffer the forfeiture prescribed by this act, and in addition thereto, upon payment of the taxes and penalties which would have accrued under said act of 1905, or any of the acts amendatory thereof, if such forfeiture had not occurred.

Any foreign corporation which has suffered a forfeiture of its right to do business in this state under the provisions of said act of 1905, or any act amendatory thereof, may be relieved from the effect thereof and resume an intrastate business in this state upon filing with the secretary of state an affidavit by its president or secretary, setting forth the amount of its capital stock at time of taking effect of this act, and stating any subsequent changes in said authorized capital stock, and the dates on which such changes became effective, and shall pay to the secretary of state all taxes and penalties which would have accrued under said act of 1905, or under any of the acts amendatory thereof if such forfeiture had not occurred, and the taxes and penalties which would have accrued under the provisions of this act; whereupon such corporation shall be restored to its former corporate status and the secretary of state shall issue to such corporation a license entitling it to do intrastate business in this state during the year for which the license is issued. And the secretary of state shall, on or before the first Monday of April of each year, make a list of the corporations, both foreign and domestic, so paying, and of the foreign corporations which have resumed the transaction of intrastate business in this state, as provided in section fifteen of this act, and shall transmit a certified copy of said list to each county clerk in this state, who shall file the same in his office; *provided*, the rehabilitation of any such corporation by reason of making such payments shall be without prejudice to any action, defense, or right which accrued by reason of the original forfeiture.

SEC. 15. Any foreign corporation may surrender its right to engage in intrastate business in this state by filing a stipulation with the secretary of state, in which it shall agree that it will not transact such business at any time thereafter without first obtaining from the secretary of state a license authorizing the resump-

tion of such business, as hereinafter provided. Upon the filing of such stipulation and upon the payment of any tax or penalty then due, said corporation shall be exempt from the payment of the tax provided in this act. It shall be unlawful for any such corporation to exercise its corporate powers in transacting any intrastate business in this state after the filing of such stipulation. Each and every person who exercises any of the powers of such corporation in the transaction of intrastate business or who transacts any intrastate business for or in behalf of such corporation after such filing shall be subject to penalties prescribed by section twelve of this act.

Any such corporation may resume the transaction of intrastate business in this state at any time thereafter upon filing its application for a license therefor with the secretary of state and an affidavit by its president or secretary setting forth the amount of its authorized capital stock, and copies of any documents increasing or diminishing such capital stock, which copies shall be certified as herein provided, and upon paying a tax for the unexpired portion of the year which shall be measured by its authorized capital stock and which shall be that portion of the license tax specified in section four of this act which the unexpired number of months of such year, including the month in which such license is issued, bears to the entire year.

SEC. 16. Any false statement contained in any of the affidavits herein required shall constitute perjury, and shall be punishable as such.

SEC. 17. All moneys herein required to be paid shall, upon collection by the secretary of state, be immediately paid by him into the state treasury.

SEC. 18. Nothing in this act shall be construed as affecting or repealing any statute of this state respecting the assessment of franchises and levying of taxes thereon.

SEC. 19. The provisions of this act in so far as they relate to the payment of the license tax provided for in section four of this act shall take effect on the first day of January, 1916, and as to all other provisions this act shall take effect ninety days after final adjournment of the forty-first session of the legislature.

PROTECTION OF STOCKHOLDERS.

An act to amend an act entitled "An act to protect stockholders and persons dealing with corporations in this state," approved March 29, 1878, and all acts amendatory thereof, and to repeal all laws in conflict therewith.

[Approved March 22, 1905.]

The people of the State of California, represented in senate and assembly, do enact as follows:

SECTION 1. Any superintendent, director, secretary, manager, agent, or other officer, of any corporation formed or existing under the laws of this state, or transacting business in the same, and any person pretending or holding himself out as such superintendent, director, secretary, manager, agent, or other officer, who shall wilfully subscribe, sign, endorse, verify, or otherwise assent to the publication, either generally or privately, to the stockholders or other persons dealing with such corporation, or its stock, any untrue or wilfully and fraudulently exaggerated report, prospectus, account, statement of operations, values, business, profits, expenditures or prospects, or other paper or document intended to produce or give, or having a tendency to produce or give, to the shares of stock in such corporation a greater value or less apparent or market value than they really possess, or with the intention of defrauding any particular person or persons, or the public, or persons generally, shall be deemed guilty of a felony, and on conviction thereof shall be punished by imprisonment in state prison or a county jail not exceeding two years, or by fine not exceeding five thousand dollars, or by both.

SEC. 2. All acts and parts of acts in conflict with this act are hereby repealed.

CIVIL CODE.

§ 309. The directors of corporations must not make dividends, except from the surplus profits arising from the business thereof; nor must they create any debts beyond their subscribed capital stock; nor must they divide, withdraw or pay to

the stockholders, or any of them, any part of the capital stock, except as hereinafter provided, nor reduce or increase the capital stock, except as herein specially provided. For a violation of the provisions of this section, the directors under whose administration the same may have happened (except those who may have caused their dissent therefrom to be entered at large on the minutes of the directors at the time, or were not present when the same did happen) are, in their individual or private capacity, jointly and severally liable to the corporation, and to the creditors thereof, to the full amount of the capital stock so divided, withdrawn, paid out, or reduced, or debt contracted; and no statute of limitation is a bar to any suit against such directors for any sums for which they are liable by this section; *provided, however*, that where a corporation has been heretofore or may hereafter be formed for the purpose, among other things, of acquiring, holding, and selling real estate, water, and water rights, the directors of such corporation may, with the consent of stockholders representing two-thirds of the capital stock thereof, given at a meeting called for that purpose, divide among the stockholders the land, water or water rights so by such corporation held, in the proportions to which their holdings of such stock at the time of such division entitled them. All conveyances made by the corporation in pursuance of this section must be made and received subject to the debts of such corporation existing at the date of the conveyance thereof. Nothing herein prohibits a division and distribution of the capital stock of any corporation which remains after the payment of all its debts, upon its dissolution, or the expiration of its term of existence.

PENAL CODE.

§ 560. Every director of any stock corporation who concurs in any vote or act of the directors of such corporation or any of them, by which it is intended, either—

1. To make any dividend, except from the surplus profits arising from the business of the corporation, and in the cases and manner allowed by law; or,

2. To provide, withdraw, or in any manner, except as provided by law, pay to the stockholders, or any of them, any part of the capital stock of the corporation; or,

3. To discount or receive any note or other evidence of debt in payment of any installment actually called in and required to be paid, or with the intent to provide the means of making such payment; or,

4. To receive or discount any note or other evidence of debt, with the intent to enable any stockholder to withdraw any part of the money paid in by him, or his stock; or,

5. To receive from any other stock corporation, in exchange for the shares, notes, bonds, or other evidences of debt of their own corporation, shares of the capital stock of such other corporation, or notes, bonds, or other evidence of debt issued by such other corporation—is guilty of a misdemeanor.

THE RIGHT OF EMINENT DOMAIN.

An act to amend section twelve hundred and thirty-eight of the Code of Civil Procedure, relating to the purposes for which the right of eminent domain may be exercised, and repealing all acts and parts of acts in conflict with this act.

[Approved April 28, 1911.]

SECTION 1. Section twelve hundred and thirty-eight of the Code of Civil Procedure is hereby amended to read as follows:

§ 1238. Subject to the provisions of this title, the right of eminent domain may be exercised in behalf of the following public uses:

4. Wharves, docks, piers, chutes, booms, ferries, bridges, toll roads, by-roads, plank, and turnpike roads; paths and roads either on the surface, elevated, or depressed, for the use of bicycles, tricycles, motor cycles and other horseless vehicles, steam, electric, and horse railroads, canals, ditches, dams, poundings, flumes, aqueducts and pipes for irrigation, public transportation, supplying mines and farming neighborhoods with water, and draining and reclaiming lands, and for floating logs and lumber on streams not navigable.

5. Roads, tunnels, ditches, flumes, pipes and dumping places for working mines; also outlets, natural or otherwise, for the flow, deposit, or conduct of tailings or refuse matter from mines; also an occupancy in common by the owners or possessors of different mines of any place for the flow, deposit, or conduct of tailings or refuse matter from their several mines.

6. By-roads leading from highways to residences, farms, mines, mills, factories and buildings for operating machinery, or necessary to reach any property used for public purposes.

7. Telegraph and telephone lines, systems and plants.

9. Roads for transportation by traction engines or road locomotives.

10. Oil pipe lines.

11. Roads and flumes for logging or lumbering purposes.

12. Canals, reservoirs, dams, ditches, flumes, aqueducts and pipes and outlets natural or otherwise for supplying, storing and discharging water for the operation of machinery for the purpose of generating and transmitting electricity for the supply of mines, quarries, railroads, tramways, mills, and factories with electric power; and also for the applying of electricity to light or heat mines, quarries, mills, factories, incorporated cities and counties, villages or towns; and also for furnishing electricity for lighting, heating or power purposes to individuals or corporations, together with lands, buildings and all other improvements in or upon which to erect, install, place, use or operate machinery for the purpose of generating and transmitting electricity for any of the purposes or uses above set forth.

SEC. 2. All acts and parts of acts in conflict with this act are hereby repealed.

SEC. 3. This act shall take effect immediately.

An act to amend section 1239 of the Code of Civil Procedure, relating to proceedings to exercise the right of eminent domain.

[Approved April 5, 1911.]

SECTION 1. Section 1239 of the Code of Civil Procedure of the State of California, is hereby amended to read as follows:

§ 1239. The following is a classification of the estates and rights in lands subject to be taken for public use:

1. A fee simple, when taken for public buildings or grounds, or for permanent buildings, for reservoirs and dams, and permanent flooding occasioned thereby, or for an outlet for a flow, or a place for the deposit of debris or tailings of a mine.

* * *

USE OF CALIFORNIA MATERIALS IN CALIFORNIA PUBLIC BUILDINGS.

Section 3247 of the Political Code.

"Any person, committee, board, officer, or any other person charged with the purchase, or permitted or authorized to purchase, supplies, goods, wares, merchandise, manufactures, or produce, for the use of the state, or any of its institutions or offices, or for the use of any county or consolidated city and county, or city, or town, shall always, price, fitness and quality being equal, prefer such supplies, goods, wares, merchandise, manufactures, or produce as has been grown, manufactured or produced in this state, and shall next prefer such as have been partially so manufactured, grown or produced in this state. All state, county, city and county, city or town officers, all boards, commissions, or other persons charged with advertising for any such supplies, shall state in their advertisement that such preferences will be made. In any such advertisement no bid shall be asked for any article of a specific brand or mark nor any patent apparatus or appliances, when such requirement would prevent proper competition on the part of dealers in other articles of equal value, utility or merit."

LANDS UNCOVERED BY RECESSION OF WATER.

An act to amend section 3493m of the Political Code, relating to land uncovered by the recession or drainage of the waters of inland lakes.

[Approved April 14, 1911.]

The people of the State of California, represented in senate and assembly, do enact as follows:

SECTION 1. Section 3493m of the Political Code is hereby amended to read as follows:

Section 3493m. Any person desiring to purchase any of the lands now uncovered or which may hereafter be uncovered by the recession or drainage of the waters of inland lakes, and inuring to the state by virtue of her sovereignty, or the swamp and overflowed lands not segregated by the United States, must make an application therefor to the surveyor general of the state, which application must be accompanied by the applicant's affidavit that he is a citizen of the United States, or has declared his intention to become such, a resident of this state, of lawful age, that he desires to purchase such lands (describing them by legal subdivisions, or by metes and bounds, if the legal subdivisions are unknown), under the provisions of this article, for his own use and benefit, and for the use and benefit of no other person whomsoever, and that he has made no contract or agreement to sell the same, and that he does not own any state lands which, together with that now sought to be purchased, exceeds six hundred and forty acres.

The provisions of this section shall not affect or apply to any land uncovered by the recession or drainage of the waters of any lake or other body of water, the waters of which are so impregnated with minerals as to be valuable for the purpose of extracting therefrom such minerals; but the land uncovered by the recession or drainage of such waters shall be subject to lease for periods of not longer than twenty-five years upon such charges, terms and conditions as may be prescribed by law.

SEC. 2. All acts or parts of acts in conflict herewith are hereby repealed.

SEC. 3. This act shall take effect immediately.

EXTRACTION OF MINERALS FROM WATER.

An act regulating the extraction of minerals from the waters of any stream or lake and prohibiting the extraction of minerals from said waters except under lease from or express permission of the state for a period not exceeding twenty-five years.

[Approved April 14, 1911.]

The people of the State of California, represented in senate and assembly, do enact as follows:

SECTION 1. Minerals contained in the waters of any stream or lake in this state shall not be extracted from said waters except upon charges, terms and conditions prescribed by law. No person, firm, corporation or association shall hereafter gain the right to extract or cause to be extracted said minerals from said waters by user, custom, prescription, appropriation, littoral rights, riparian rights, or in any manner other than by lease from or express permission of the state as prescribed by law; and no such lease or permission shall be granted for a longer period than twenty-five years.

SEC. 2. All acts or parts of acts in conflict herewith are hereby repealed.

SEC. 3. This act shall take effect immediately.

MINERAL LANDS WITHIN MEANDER LINES OF LAKES AND STREAMS.

An act relating to lakes and streams, the waters of which contain minerals in commercial quantities; withdrawing state lands within the meander lines thereof from sale; prescribing conditions for taking such minerals from said waters and lands, and providing for the leasing of lands uncovered by the recession of the waters of such lakes and streams.

[Approved April 27, 1911.]

The people of the State of California, represented in senate and assembly, do enact as follows:

SECTION 1. There is hereby withdrawn from selection and sale all of the lands embraced within the original meander lines of streams and lakes belonging to the state, the waters of which contain minerals in commercial quantities, and all such lands which may hereafter inure to the state by virtue of its sovereignty, excepting such lands now contracted to be sold under sections 3493m to 3493t, both inclusive, of the Political Code.

SEC. 2. No person, firm or corporation shall take water from such streams or lakes containing minerals and extract from such water such minerals, except under the terms and conditions of this act; and no person, firm or corporation may lease any land herein referred to and extract therefrom minerals deposited therein or thereon, except under the terms and conditions of this act.

SEC. 3. Every person, firm or corporation taking from the waters of such stream, lakes or lands any minerals, shall file, on or before the last Monday in January of each year, with the county assessor of the county in which any such stream or lake is situated, and also with the state controller, a written statement, duly verified, showing in tons of two thousand pounds, the amount of mineral taken by such person, firm or corporation from such water or land during the year ending December 31st last preceding, and sold by said person, firm or corporation during the said year preceding. Any such person, firm or corporation neglecting or refusing to furnish such statement shall be subject to a fine of one hundred dollars for each day after the said last Monday in January such person, firm or corporation, shall fail to furnish such statement, and, in addition to said fine, shall forfeit all leases granting the right to extract such minerals from said water and said land. Any person who shall, either on behalf of himself or any firm or corporation, verify any such statement which shall be untrue in any material part, shall be deemed guilty of a misdemeanor.

SEC. 4. In case either the assessor or the state controller shall not be satisfied with the statement as returned, he may make an examination of the matters necessary to verify or correct said statement, and, for that purpose, may subpoena witnesses and call for and compel the production of necessary books and papers belonging to the person, firm or corporation making the returns.

SEC. 5. The county assessor of the county shall, after examination and approval by him and the state controller of such statement, proceed to collect from such person, firm or corporation a royalty of twenty-five cents for each ton of two thousand pounds of mineral taken from such water or land by such person, firm or corporation and sold, during the preceding year, in the manner provided for the collection of personal property taxes; *provided*, that the royalty on sodium bicarbonate and on sodium hydrate so taken shall be fifty (50) cents for each ton of two thousand pounds.

SEC. 6. Any person, firm or corporation desiring to lease any lands under this act must make application therefor to the surveyor general of the state, describing the lands sought to be leased by legal subdivisions, or if the legal subdivisions are unknown to the applicant by metes and bounds. The application must be accompanied by a filing fee of ten dollars.

SEC. 7. Upon the receipt of such application, the surveyor general shall direct the county surveyor of the county in which such lands are situated to survey the land sought to be leased. The county surveyor shall make an actual survey of the land, at the expense of the applicant, establishing the four corners to each quarter

section, and connecting the same with a United States survey; and, within thirty days file with the surveyor general a copy, under oath, of his field notes and plat. If the county surveyor fails to make the survey as herein provided, the surveyor general shall immediately direct another person to make the survey at the expense of the applicant, and said survey shall be made and completed within thirty days after the authorization, and the field notes and plats, or copies thereof, shall be sworn to by the surveyor making them and shall be filed with the surveyor general.

SEC. 8. All applications to lease land under this act shall be approved or rejected by the surveyor general within ninety days after the receipt thereof. Immediately after the approval of the application, the surveyor general shall execute and deliver to the applicant a lease of the lands described in the application.

SEC. 9. The lands designated in this act shall be leased at the rate of two dollars and fifty cents per acre, per year, payable yearly in advance. All moneys received as rental for such lands and as royalty upon the mineral product of the waters of the lakes, streams or lands above mentioned, shall be paid into the state school land fund.

SEC. 10. Whenever any lease is delivered to the applicant by the surveyor general, the lessee shall within fifteen days thereafter, present said lease to the treasurer of the State of California, and make payment of the first annual rental. The treasurer shall receive the money and give a receipt therefor. All subsequent annual payments of rental must be paid to the state treasurer, in like manner, within fifteen days after they become due. In case payments are not made as herein provided, the lease and all rights thereunder shall cease and terminate. No lease shall run for more than twenty-five years; *provided*, that upon the expiration of any lease, such lease may be extended for a period of twenty-five years upon such terms and conditions as may then be prescribed by law.

SEC. 11. All leases made under the authority of this act shall contain a reservation to the state of a right to locate rights of way across such leased lands, subject only to the requirements that the rights of way shall be located in such manner as to cause the least injury to the leased lands across which the same may be located, and that any damage suffered by the lessee of such lands shall be compensated by the lessee of the lands for whose benefit the right of way is required; and every such lease shall be subject to, and shall contain a reservation of, the right of any city and county or incorporated city or town of this state to at any time appropriate and take, under the laws of this state relative to the appropriation of waters, water from any stream or lake tributary to or discharging into any stream or lake of the character mentioned in section one of this act, for any use or uses within the authorized powers of such city and county, or incorporated city or town.

SEC. 12. Leases of rights of way, not exceeding one hundred feet in width, for access to any water or lands designated by this act, may be applied for and granted in the manner herein provided for leasing lands. Such rights of way shall be leased at an annual rental of two dollars and fifty cents an acre, and the same shall be paid as herein provided for leased lands.

SEC. 13. All leases of mineral lands provided for by this act shall cease and terminate on December 31st of any year if the lessee or assigns has not, during the year preceding, extracted or removed from such land and water an amount of mineral equal, in the aggregate, to a minimum of five tons per acre of land leased; *provided*, that when a lease is not delivered to the lessee until after the fifteenth day of January of any year, the minimum tonnage for such year shall be less than five (5) tons, and shall be proportional to the number of days remaining in such year after the completion of the works.

SEC. 14. The surveyor general is hereby authorized to prepare, make, execute and deliver all papers, instruments and documents, and to do any and all things necessary to carry out the provisions of this act.

SEC. 15. The legislature shall have the right to change, from time to time, the royalty per ton of minerals extracted and the annual rental per acre of land, and such change shall apply to all persons, firms or corporations holding leases hereunder; *provided*, that no lease given under this act shall be subject to any change,

is to the royalty or rental provided for in said lease, subsequent to the execution of such lease until after ten years from the passage of this act.

SEC. 16. Any lessee hereinunder may abandon and surrender a lease at the expiration of any calendar year by filing with the county assessor of the county in which is situated the lands described in said lease, and with the surveyor general and the state controller, notices of said abandonment or surrender; but said notices must be filed at least sixty days before the expiration of said calendar year; and said abandonment and surrender shall not absolve the said lessee from the payment of any royalty which may be due at the end of said fiscal year, for minerals extracted from the waters or lands in this act specified.

SEC. 17. This act shall take effect immediately.

HYDRAULIC MINING.

Where hydraulic mining can be carried on.

§ 1424. The business of hydraulic mining may be carried on within the State of California wherever and whenever the same can be carried on without material injury to the navigable streams, or the lands adjacent thereto.

Meaning of hydraulic mining.

§ 1425. Hydraulic mining, within the meaning of this title, is mining by the means of the application of water, under pressure, through a nozzle, against a natural bank.

(For Federal regulations on hydraulic mining, see pp. 151-156.)

MINER'S INCH DEFINED.

An act fixing and defining a miner's inch of water.

[Approved March 23, 1901.]

The people of the State of California, represented in senate and assembly, do enact as follows:

SECTION 1. The standard miner's inch of water shall be equivalent or equal to one and one-half cubic feet of water per minute, measured through any aperture or orifice.

SEC. 2. All acts or parts of acts inconsistent with the provisions of this act are hereby repealed.

SEC. 3. This act shall be in effect and force sixty days from and after its passage.

LARCENY OF GOLD-DUST AND AMALGAM.

An act supplementary to an act entitled "An act concerning crimes and punishments," passed April 16, 1850.

[Approved March 20, 1872; 1871-2, 435.]

SECTION 1. Every person who shall feloniously steal, take and carry away, or attempt to take, steal, and carry from any mining claim, tunnel, sluice, under-current, riffle-box, or sulphurate (sulphuret) machine any gold-dust, amalgam, or quick-silver, the property of another, shall be deemed guilty of grand larceny, and upon conviction thereof shall be punished by imprisonment in the state prison for any term of not less than one year nor more than fourteen years.

SEC. 2. This act shall be in force from and after its passage.

REGULATION OF HOURS OF EMPLOYMENT.

An act regulating the hours of employment in underground mines, underground workings, whether for the purpose of tunneling, making excavations, or to accomplish any other purpose or design, or in smelting and reduction works

[Approved May 30, 1913.]

The people of the State of California do enact as follows:

SECTION 1. That the period of employment for all persons who are employed or engaged in work in underground mines in search of minerals, whether base or precious, or who are engaged in such underground mines for other purposes, or who are employed or engaged in any other underground workings whether for the purpose of tunneling, making excavations or to accomplish any other purpose or design, or who are employed in smelters and other institutions for the reduction or refining of ores or metals, shall not exceed eight hours within any twenty-four hours, and the hours of employment in such employment or work day shall be consecutive, excluding however, any intermission of time for lunch or meals; provided, that in case of emergency where life or property is in imminent danger, the period may be a longer time during the continuance of the exigency or emergency.

SEC. 2. Any person who shall violate any provision of this act, and any person who as foreman, manager, director or officer of a corporation, or as the employer or superior officer of any person, shall command, persuade or allow any person to violate any provision of this act, shall be guilty of a misdemeanor and upon conviction shall be punished by a fine of not less than fifty dollars (\$50.00) nor more than three hundred dollars (\$300.00) or by imprisonment of not more than three months. And the court shall have discretion to impose both fine and imprisonment as herein provided.

SEC. 3. All acts and parts of acts inconsistent with this act are hereby repealed.

PROVIDING FOR MINE EXITS.

An act requiring compensation for causing death by wrongful act, neglect or default.

[Approved April 26, 1862.]

SECTION 1. It shall not be lawful for any corporation, association, owner or owners of any quartz mining claim within the State of California, where such corporation, association, owner or owners employ twelve men daily, to sink down into such mine or mines any perpendicular shaft or incline beyond a depth from the surface of three hundred feet without providing a second mode of egress from such mine, by shaft or tunnel, to connect with the main shaft at a depth of not less than one hundred feet from the surface.

SEC. 2. It shall be the duty of each corporation, association, owner or owners of any quartz mine or mines in this state, where it becomes necessary to work such mines beyond the depth of three hundred feet, and where the number of men employed therein daily shall be twelve or more, to proceed to sink another shaft or construct a tunnel so as to connect with the main working shaft of such mine as a mode of escape from underground accident or otherwise. And all corporations, associations, owner or owners of mines, as aforesaid, working at a greater depth than three hundred feet, not having any other mode of egress than from the main shaft, shall proceed as herein provided.

SEC. 3. When any corporation, association, owner or owners of any quartz mine in this state shall fail to provide for the proper egress, as herein contemplated, and where any accident shall occur, or any miner working therein shall be hurt or injured, and from injury might have escaped if the second mode of egress had existed, such corporation, association, owner or owners of the mine where the injuries shall have occurred shall be liable to the person injured in all damages that may accrue by reason thereof; and an action at law in a court of competent jurisdiction may be maintained against the owner or owners of such mine, which owners shall be jointly or severally liable for such damages. And where death shall ensue from

injuries received from any negligence on the part of the owners thereof, by reason of their failure to comply with any of the provisions of this act, the heirs or relatives surviving the deceased may commence an action for the recovery of such damages.

SEC. 4. This act shall take effect and be in force six months from and after its passage.

TELEPHONE SYSTEM IN MINES.

An act providing for the establishment and maintenance of a telephone system in mines and prescribing a penalty for the violation thereof.

[Approved June 13, 1913.]

The people of the State of California do enact as follows:

SECTION 1. In all mines operated and worked in this state where a depth of more than five hundred feet underground has been reached a telephone system must be established, equipped and maintained by the owners or lessees thereof with stations at each working level below the depth aforesaid, communicating with a station thereof on the surface of any such mine.

SEC. 2. The failure or refusal of any owner or lessee to install or maintain such telephone system shall be deemed guilty of misdemeanor and punished accordingly.

FENCING ABANDONED SHAFTS.

An act to provide for the covering or fencing of abandoned mining shafts, pits or excavations, the penalty, and also the penalty for removing or destroying the covering or fencing from the same.

[Approved March 20, 1903.]

The people of the State of California, represented in senate and assembly, do enact as follows.

SECTION 1. All abandoned mining shafts, pits or abandoned excavations dangerous to passers-by or live stock shall be securely covered or fenced, and kept so, by the owners of the land or persons in charge of the same, on which such shafts, pits or other excavations are located. Any person or persons failing to comply with the provisions of this section shall be deemed guilty of a misdemeanor.

SEC. 2. All abandoned mining shafts, pits or other excavations situated on unoccupied public lands may be securely covered or fenced by order of the board of supervisors of the county wherein the same is situated, and it shall be the duty of the board of supervisors to keep the same securely fenced or covered whenever it appears to them, by proof submitted, that the same is dangerous or unsafe to man or beast. The cost of said covering or fencing to be a county charge.

SEC. 3. Any person or persons maliciously removing or destroying any covering or fencing placed around or over any shaft, pit or other excavation, as hereinbefore provided, shall be deemed guilty of a misdemeanor.

SEC. 4. This act shall take effect six months from the day of passage.

CALIFORNIA MINE BELL SIGNALS.

An act to establish a uniform system of mine bell signals, to be used in all the mines operated in the State of California, and for the protection of miners.

[Approved March 8, 1893.]

SECTION 1. Every person, company, corporation, or individual, operating any mine within the State of California—gold, silver, copper, lead, coal, or any other metal or substance—where it is necessary to use signals by means of bell or otherwise, for shafts, inclines, drifts, crosscuts, tunnels, and underground workings, shall,

after the passage of this bill, adopt, use, and put in force the following system or code of mine bell signals, as follows:

1 bell, to hoist. (See Rule 2.)

1 bell, to stop if in motion.

2 bells, to lower. (See Rule 2.)

3 bells, man to be hoisted; run slow. (See Rule 2.)

4 bells, start pump if not running, or stop pump if running.

1—3 bells, start or stop air compressor.

5 bells, send down tools. (See Rule 4.)

6 bells, send down timbers. (See Rule 4.)

7 bells, accident; move bucket or cage by verbal orders only.

1—4 bells, foreman wanted.

2—1—1 bells, done hoisting until called.

2—1—2 bells, done hoisting for the day.

2—2—2 bells, change buckets from ore to water, or vice versa.

3—2—1 bells, ready to shoot in the shaft. (See Rule 3.)

Engineer's signal, that he is ready to hoist, is to raise the bucket or cage two feet and lower it again. (See Rule 3.)

Levels shall be designated and inserted in notice hereinafter mentioned. (See Rule 5.)

SEC. 2. For the purpose of enforcing and properly understanding the above code of signals, the following rules are hereby established:

Rule 1—In giving signals make strokes on bell at regular intervals. The bar (—) must take the same time as for one stroke of the bell, and no more. If timber, tools, the foreman, bucket or cage are wanted to stop at any level in the mine, signal by number of strokes on the bell, number of the level first before giving the signal for timber, tools, etc. Time between signals to be double bars (— —). Example:

6—5 would mean stop at sixth level with tools.

4—1—1—1—1, would mean to stop at fourth level, man on, hoist.

2—1—4 would mean stop at second level with foreman.

Rule 2—No person must get off or on the bucket or cage, while the same is in motion. When men are to be hoisted give the signal for men. Men *must* then get on bucket or cage, *then* give the signal to hoist. Bell cord must be in reach of man on the bucket or cage at stations.

Rule 3—After signal "Ready to shoot in shaft," engineer must give his signal when he is ready to hoist. Miners must then give the signal of "Men to be hoisted," then "spit fuse," get into the bucket, and give the signal to hoist.

Rule 4—All timbers, tools, etc., "longer than the depth of the bucket," to be hoisted or lowered, must be securely lashed at the upper end to the cable. Miners must know they will ride up or down the shaft without catching on rocks or timbers and be thrown out.

Rule 5—The foreman will see that one printed sheet of these signals and rules for each level and one for the engine-room are attached to a board not less than twelve inches wide by thirty-six inches long, and securely fasten the board up where signals can be easily read at the places above stated.

Rule 6—The above signals and rules must be obeyed. Any violation will be sufficient grounds for discharging the party or parties so doing. No person, company, corporation, or individual operating any mine within the State of California, shall be responsible for accidents that may happen to men disobeying the above rules and signals. Said notice and rules shall be signed by the person or superintendent having charge of the mine, who shall designate the name of the corporation or the owner of the mine.

SEC. 3. Any person or company failing to carry out any of the provisions of this act shall be responsible for all damages arising to or incurred by any person working in said mine during the time of such failure.

SEC. 4. This act shall take effect immediately.

FEDERAL STATUTES.

Title XXXII, Chapter 6, Revised Statutes.

SEC. 2319. All valuable mineral deposits in lands belonging to the United States, both surveyed and unsurveyed, are hereby declared to be free and open to exploration and purchase, and the lands in which they are found to occupation and purchase, by citizens of the United States and those who have declared their intention to become such, under regulations prescribed by law, and according to the local customs or rules of miners in the several mining districts, so far as the same are applicable and not inconsistent with the laws of the United States.

SEC. 2320. Mining claims upon veins or lodes of quartz or other rock in place bearing gold, silver, cinnabar, lead, tin, copper, or other valuable deposits, heretofore located, shall be governed as to length along the vein or lode by the customs, regulations, and laws in force at the date of their location. A mining claim located after the tenth day of May, eighteen hundred and seventy-two, whether located by one or more persons, may equal, but shall not exceed, one thousand five hundred feet in length along the vein or lode; but no location of a mining claim shall be made until the discovery of the vein or lode within the limits of the claim located. No claim shall extend more than three hundred feet on each side of the middle of the vein at the surface, nor shall any claim be limited by any mining regulation to less than twenty-five feet on each side of the middle of the vein at the surface, except where adverse rights existing on the tenth day of May, eighteen hundred and seventy-two, render such limitation necessary. The end lines of each claim shall be parallel to each other.

SEC. 2321. Proof of citizenship, under this chapter, may consist in the case of an individual, of his own affidavit thereof; in the case of an association of persons unincorporated, of the affidavit of their authorized agent, made on his own knowledge, or upon information and belief; and in the case of a corporation organized under the laws of the United States, or of any state or territory thereof, by the filing of a certified copy of their charter or certificate of incorporation.

This is supplemented by an act of April 26, 1882, which provides:

"That applicants for mineral patents, if residing beyond the limits of the district wherein the claim is situated, may make any oath or affidavit required for proof of citizenship before the clerk of any court of record, or before any notary public of any state or territory." (22 Stats. at Large, p. 49, chap. 106.)

SEC. 2322. The locators of all mining locations heretofore made or which shall hereafter be made, on any mineral vein, lode, or ledge, situated on the public domain, their heirs and assigns, where no adverse claims exist on the tenth day of May, eighteen hundred and seventy-two, so long as they comply with the laws of the United States, and with state, territorial and local regulations not in conflict with the laws of the United States governing their possessory title, shall have the exclusive right of possession and enjoyment of all the surface included within the lines of their locations, and of all veins, lodes and ledges throughout their entire depth, the top or apex of which lies inside of such surface lines extended downward vertically, although such veins, lodes, or ledges may so far depart from a perpendicular in their course downward as to extend outside the vertical side lines of such surface locations. But their right of possession to such outside parts of such veins or ledges shall be confined to such portions thereof as lie between vertical planes drawn downward as above described through the end lines of their locations, so continued in their own direction that such planes will intersect such exterior parts of such veins or ledges. And nothing in this section shall authorize the locator or possessor of a vein, or lode which extends in its downward course beyond the vertical lines of his claim, to enter upon the surface of a claim owned or possessed by another.

SEC. 2323. Where a tunnel is run for the development of a vein or lode, or for the discovery of mines, the owners of such tunnel shall have the right of possession of all veins or lodes within three thousand feet from the face of such tunnel on the line thereof, not previously known to exist, discovered in such tunnel, to the same

extent as if discovered from the surface and locations on the line of such tunnel of veins or lodes not appearing on the surface, made by other parties after the commencement of the tunnel, and while the same is being prosecuted with reasonable diligence, shall be invalid, but failure to prosecute the work on the tunnel for six months shall be considered as an abandonment of the right to all undiscovered veins on the line of such tunnel.

SEC. 2324. The miners of each mining district may make regulations not in conflict with the laws of the United States, or with the laws of the state or territory in which the district is situated, governing the location, manner of recording, amount of work necessary to hold possession of a mining claim, subject to the following requirements: The location must be distinctly marked on the ground so that its boundaries can be readily traced. All records of mining claims hereafter made shall contain the name or names of the locators, the date of the location, and such a description of the claim or claims located by reference to some natural object or permanent monument as will identify the claim. On each claim located after the tenth day of May, eighteen hundred and seventy-two, and until a patent has been issued therefor, not less than one hundred dollars' worth of labor shall be performed or improvements made during each year.

Be it enacted by the senate and house of representatives of the United States of America in congress assembled, that section two thousand, three hundred and twenty-four of the Revised Statutes be, and the same is hereby, amended so that where a person or company has or may run a tunnel for the purpose of developing a lode or lodes, owned by said person or company, the money so expended in said tunnel shall be taken and considered as expended on said lode or lodes, whether located prior to or since the passage of said act; and such person or company shall not be required to perform work on the surface of said lode or lodes in order to hold the same as required by said act. (18 Stats. at Large, page 315, chap. 41.)

Annual Assessments.

An amendment of January 22, 1880, reads:

"Provided, that the period within which the work required to be done annually on all unpatented mineral claims shall commence on the first day of January succeeding the date of location of such claim, and this section shall apply to all claims located since the tenth day of May, Anno Domini eighteen hundred and seventy-two." (21 Stats. at Large, page 61, chap. 9.)

The federal law fixes the minimum of labor requirements. State and local laws may require additional work as part of the act of location. This has been sustained by Supreme Court decisions.

Patents.

Section 2325 of the federal statutes provides that after \$500 has been expended on a mining claim in work or improvements, a patent may be applied for, upon the claim being surveyed by a United States mineral surveyor, and by the payment of \$5 per acre for the land to the United States government.

PLACERS.

SEC. 2329. Claims usually called "placers" including all forms of deposit, excepting veins of quartz, or other rock in place, shall be subject to entry and patent, under like circumstances and conditions, and upon similar proceedings, as are provided for vein or lode claims; but where the lands have been previously surveyed by the United States, the entry in its exterior limits shall conform to the legal subdivisions of public lands.

Lindley on Mines, 3d ed., 1914, Sec. 420, pp. 987 et seq. says: "Among the substances, other than those of a metallic character, which have been classified as mineral, and when occurring in the form of deposits not in place, lands containing which have been held to be subject to appropriation under the placer laws, we note the following: Alum; asphaltum; borax; diamonds; guano; gypsum; kaolin or china clay; marble; mica; onyx; soda, carbonate or nitrate; slate for roofing pur-

poses; umber; building stone. * * * Other substances require specific mention." Under these "other substances," are detailed: Petroleum; natural gas; brick and other classes of clay; phosphates; potash. In addition to the above named the following have also "been held to be mineral by the United States Land Department and the American courts: Amber; stone of special commercial value; cement (see gypsum); coal; gravel; limestone; salt; sand; sandstone (see building stone); sulphur." (id. Sec. 97, pp. 170 et seq.)

[Act of August 4, 1892, ch. 375, 27 Stat. L. 348.]

Entry of building stone lands under placer laws.

SECTION 1. Any person authorized to enter lands under the mining laws of the United States may enter lands that are chiefly valuable for building stone under the provisions of the law in relation to placer mineral claims; *provided*, that lands reserved for the benefit of the public schools or donated to any state shall not be subject to entry under this act. (27 Stat. L. 348.)

[Act of January 31, 1901, ch. 186, 31 Stat. L. 745.]

Entry of saline lands under placer laws.

All unoccupied public lands of the United States containing salt springs, or deposits of salt in any form, and chiefly valuable therefor, are hereby declared to be subject to location and purchase under the provisions of the law relating to placer mining claims; *provided*, that the same person shall not locate or enter more than one claim hereunder. (31 Stat. L. 745.)

SEC. 2330. Legal subdivisions of forty acres may be subdivided into ten-acre tracts, and two or more persons or associations of persons, having contiguous claims of any size, although such claims may be less than ten acres each, may make joint entry thereof; but no location of a placer claim, made after the ninth day of July, eighteen hundred and seventy, shall exceed one hundred and sixty acres for any one person or association of persons, which location shall conform to the United States surveys; and nothing in this section contained shall defeat or impair any bona fide preemption or homestead claim upon agricultural lands, or authorize the sale of the improvements of any bona fide settler to any purchaser.

SEC. 2331. Where placer claims are upon surveyed lands, and conform to legal subdivisions, no further survey or plat shall be required, and all placer mining claims located after the tenth day of May, eighteen hundred and seventy-two, shall conform as near as practicable with the United States system of public lands surveys, and the rectangular subdivisions of such surveys, and no such location shall include more than twenty acres for each individual claimant; but where placer claims can not be conformed to legal subdivisions, survey and plat shall be made as on unsurveyed lands; and where by the segregation of mineral land in any legal subdivision a quantity of agricultural land less than forty acres remains, such fractional portion of agricultural land may be entered by any party qualified by law, for homestead or preemption purposes.

Placer boundaries.

SEC. 2333. Where the same person, association, or corporation is in possession of a placer claim, and also a vein or lode included within the boundaries thereof, application shall be made for a patent for the placer claim, with the statement that it includes such vein or lode, and in such case a patent shall issue for the placer claim, subject to the provisions of this chapter, including such vein or lode upon the payment of five dollars per acre for such vein or lode claim, and twenty-five feet of surface on each side thereof. The remainder of the placer claim, or any placer claim not embracing any vein or lode claim, shall be paid for at the rate of two dollars and fifty cents per acre, together with all costs of proceedings; and where a vein or lode, such as is described in section twenty-three hundred and twenty, is known to exist within the boundaries of a placer claim, an application for a patent for such placer claim which does not include an application for the vein or lode claim shall be

construed as a conclusive declaration that the claimant of the placer claim has no right of possession of the vein or lode claim; but where the existence of a vein or lode in a placer claim is not known, a patent for the placer claim shall convey all valuable mineral and other deposits within the boundaries thereof.

OIL AND GAS CLAIMS.

These are located as placer claims. See sections 2329 to 2333, U. S. statutes.

An act authorizing entry of petroleum or other mineral oil lands under placer claim laws.

Any person authorized to enter lands under the mining laws of the United States may enter and obtain patents to lands containing petroleum or other mineral oils, and chiefly valuable therefor, under the provisions of the laws relating to placer mineral claims; *provided*, that lands containing such petroleum or other mineral oils which have heretofore been filed upon, claimed, or improved as mineral, but not yet patented, may be held and patented under the provisions of this act the same as if such filing, claim or improvement were subsequent to the date of the passage hereof. (29 Stat. L. 526.) Approved Feb. 11, 1897.

An act defining what shall constitute assessments on oil mining claims.

[Act of February 12, 1903, ch. 548, 32 Stat. L. 825.]

Where oil lands are located under the provisions of title thirty-two, chapter six, Revised Statutes of the United States, as placer mining claims, the annual assessment labor upon such claims may be done upon any one of a group of claims lying contiguous and owned by the same person or corporation, not exceeding five claims in all; *provided*, that said labor will tend to the development or to determine the oil-bearing character of such contiguous claims.

THE "PICKET BILL."

An act to authorize the President of the United States to make withdrawals of public lands in certain cases.

This provides also:

SEC. 2. All lands withdrawn under the provisions of this act shall at all times be open to exploration, discovery, occupation, and purchase, under the mining laws of the United States, so far as the same apply to minerals other than coal, oil, gas, and phosphates.

By the amendment of August 24, 1912, Congress limited the right of exploration, etc., within the withdrawn areas, to those lands which may be found to contain *metalliciferous* mineral. The scope of withdrawal was thus broadened, with the specific intention of conserving *potash* in addition to those minerals already mentioned. (37 Stats. at Large.)

However, any of these minerals may be filed upon if found in areas of the public domain *not yet withdrawn*.

MINING CLAIMS IN FOREST RESERVES.

The congressional act of June 4, 1897, provides:

"It is not the purpose or intent of these provisions, or of the act providing for such reservations, to authorize the inclusion therein of lands more valuable for the mineral therein, or for agricultural purposes, than for forest purposes."

* * *

"Nor shall anything herein prohibit any person from entering upon such forest reservations for all proper and lawful purposes, including that of prospecting, locating and developing the mineral resources thereof; *provided*, that such persons comply with the rules and regulations covering such forest reservations."

* * *

"And any mineral lands in any forest reservation which have been or may be shown to be such and subject to entry under the existing mining laws of the United States and the rules and regulations applying thereto, shall continue to be subject to such location and entry notwithstanding any provisions herein contained."

Under these statutes it is now held by the land department that the forest reserves are open to the location of mining claims. There can be no doubt of the meaning of congress upon this subject: That lands within the forest reserves are subject to the operation of the mining laws.

CALIFORNIA DEBRIS COMMISSION.

An act to create the California Debris Commission and regulate hydraulic mining in the State of California.

Be it enacted by the senate and house of representatives of the United States of America in congress assembled, That a commission is hereby created, to be known as the California Debris Commission, consisting of three members. The president of the United States shall by and with the advice and consent of the senate, appoint the commission from officers of the corps of engineers, United States army. Vacancies occurring therein shall be filled in like manner. It shall have the authority, and exercise the powers hereinafter set forth, under the supervision of the chief of engineers and direction of the secretary of war.

SEC. 2. That said commission shall organize within thirty days after its appointment by the selection of such officers as may be required in the performance of its duties, the same to be selected from the members thereof. The members of said commission shall receive no greater compensation than is now allowed by law to each, respectively, as an officer of said corps of engineers. It shall also adopt rules and regulations, not inconsistent with law, to govern its deliberations and prescribe the method of procedure under the provisions of this act.

SEC. 3. That the jurisdiction of said commission, in so far as the same affects mining carried on by the hydraulic process shall extend to all such mining in the territory drained by the Sacramento and San Joaquin river systems in the State of California. Hydraulic mining, as defined in section eight hereof, directly or indirectly injuring the navigability of said river systems, carried on in said territory other than as permitted under the provisions of this act is hereby prohibited and declared unlawful.

SEC. 4. That it shall be the duty of said commission to mature and adopt such plan or plans, from examinations and surveys already made and from such additional examinations and surveys as it may deem necessary, as will improve the navigability of all the rivers comprising said systems, deepen their channels, and protect their banks. Such plan or plans shall be matured with a view of making the same effective as against the encroachment of and damage from debris resulting from mining operations, natural erosion, or other causes, with a view of restoring, as near as practicable and the necessities of commerce and navigation demand, the navigability of said rivers to the condition existing in eighteen hundred and sixty, and permitting mining by the hydraulic process, as the term is understood in said state, to be carried on, provided the same can be accomplished without injury to the navigability of said rivers or the lands adjacent thereto.

SEC. 5. That it shall further examine, survey, and determine the utility and practicability, for the purposes hereinafter indicated, of storage sites in the tributaries of said rivers and in the respective branches of said tributaries, or in the plains, basins, sloughs, and tule and swamp lands adjacent to or along the course of said rivers, for the storage of debris or water or as settling reservoirs, with the object of using the same by either or all of these methods to aid in the improvement and protection of said navigable rivers by preventing deposits therein of debris resulting from mining operations, natural erosion, or other causes, or for affording relief thereto in flood time and providing sufficient water to maintain scouring force therein in the summer season; and in connection therewith to investigate such hydraulic and other mines as are now or may have been worked by methods intended to restrain

the debris and material moved in operating such mines by impounding dams, settling reservoirs, or otherwise, and in general to make such study of and researches in the hydraulic mining industry as science, experience and engineering skill may suggest as practicable and useful in devising a method or methods whereby such mining may be carried on as aforesaid.

SEC. 6. That the said commission shall from time to time note the conditions of the navigable channels of said river systems, by cross-section surveys or otherwise, in order to ascertain the effect therein of such hydraulic mining operations as may be permitted by its orders and such as is caused by erosion, natural or otherwise.

SEC. 7. That said commission shall submit to the chief of engineers for the information of the secretary of war, on or before the fifteenth day of November of each year a report of its labors and transactions, with plans for the construction, completion, and preservation of the public works outlined in this act, together with estimates of the cost thereof, stating what amounts can be profitably expended thereon each year. The secretary of war shall thereupon submit same to congress on or before the meeting thereof.

SEC. 8. That for the purpose of this act "hydraulic mining" and "mining by the hydraulic process," are hereby declared to have the meaning and application given to said terms in said state.

SEC. 9. That the individual proprietor or proprietors, or in case of a corporation its manager or agent appointed for that purpose, owning mining ground in the territory in the State of California mentioned in section three hereof, which it is desired to work by the hydraulic process, must file with said commission a verified petition, setting forth such facts as will comply with law and the rules prescribed by said commission.

SEC. 10. That said petition shall be accompanied by an instrument duly executed and acknowledged, as required by the law of the said state, whereby the owner or owners of such mine or mines surrender to the United States the right and privilege to regulate by law, as provided in this act, or any law that may hereafter be enacted, or by such rules and regulations as may be prescribed by virtue thereof the manner and method in which the debris resulting from the working of said mine or mines shall be restrained, and what amount shall be produced therefrom; it being understood that the surrender aforesaid shall not be construed as in any way affecting the right of such owner or owners to operate said mine or mines by any other process or method now in use in said state; *provided*, that they shall not interfere with the navigability of the aforesaid rivers.

SEC. 11. That the owners of several mining claims situated so as to require a common dumping ground or dam or other restraining works for the debris issuing therefrom in one or more sites may file a joint petition setting forth such facts in addition to the requirements of section nine hereof; and where the owner of a hydraulic mine or owners of several such mines have and use common dumping sites for impounding debris or as settling reservoirs which sites are located below the mine of an applicant not entitled to use same, such fact shall also be stated in said petition. Thereupon the same proceedings shall be had as provided for herein.

SEC. 12. A notice specifying briefly the contents of said petition and fixing a time previous to which all proofs are to be submitted shall be published by said commission in some newspaper or newspapers of general circulation in the communities interested in the matter set forth therein. If published in a daily paper such publication shall continue for at least ten days; if in a weekly paper in at least three issues of the same. Pending publication thereof said commission, or a committee thereof, shall examine the mine and premises described in such petition. On or before the time so fixed all parties interested, either as petitioners or contestants, whether miners or agriculturists, may file affidavits, plans, and maps in support of their respective claims. Further hearings, upon notice to all parties of record, may be granted by the commission when necessary.

SEC. 13. That in case a majority of the members of said commission, within thirty days after the time so fixed, concur in a decision in favor of the petitioner or petitioners, the said commission shall thereupon make an order directing the methods

and specifying in detail the manner in which operations shall proceed in such mine or mines; what restraining or impounding works, if facilities therefor can be found, shall be built, and maintained; how and of what material; where to be located; and in general set forth such further requirements and safeguards as will protect the public interests and prevent injury to the said navigable rivers, and the lands adjacent thereto, with such further conditions and limitations as will observe all the provisions of this act in relation to the working thereof and the payment of taxes on the gross proceeds of the same; *provided*, that all expense incurred in complying with said order shall be borne by the owner or owners of such mine or mines.

SEC. 14. That such petitioner or petitioners must within a reasonable time present plans and specifications of all works required to be built in pursuance of said order for examination, correction, and approval by said commission; and thereupon work may immediately commence thereon under the supervision of said commission or representative thereof attached thereto from said corps of engineers, who shall inspect same from time to time. Upon completion thereof, if found in every respect to meet the requirements of the said order and said approved plans and specifications, permission shall thereupon be granted to the owner or owners of such mine or mines to commence mining operations, subject to the conditions of said order and the provisions of this act.

SEC. 15. That no permission granted to a mine owner or owners under this act shall take effect, so far as regards the working of a mine, until all impounding dams or other restraining works, if any are prescribed by the order granting such permission, have been completed and until the impounding dams or other restraining works or settling reservoirs provided by said commission have reached such a stage as in the opinion of said commission, it is safe to use the same; *provided, however*, that if said commission shall be of the opinion that the restraining and other works already constructed at the mine or mines shall be sufficient to protect the navigable rivers of said systems and the work of said commission, then the owner or owners of such mine or mines may be permitted to commence operations.

SEC. 16. That in case the joint petition referred to in section eleven hereof is granted, the commission shall fix the respective amounts to be paid by each owner of such mines toward providing and building necessary impounding dams or other restraining works. In the event of a petition being filed after the entry of such order, or in case the impounding dam or dams or other restraining works have already been constructed and accepted by said commission, the commission shall fix such amount as may be reasonable for the privilege of dumping therein, which amount shall be divided between the original owners of such impounding dams or other restraining works in proportion to the amount respectively paid by each party owning same. The expense of maintaining and protecting such joint dam or works shall be divided among mine owners using the same in such proportion as the commission shall determine. In all cases where it is practicable, restraining and impounding works are to be provided, constructed and maintained by mine owners near or below the mine or mines before reaching the main tributaries of said navigable waters.

SEC. 17. That at no time shall any more debris be permitted to be washed away from any hydraulic mine or mines situated on the tributaries of said rivers and the respective branches of each, worked under the provisions of this act, than can be impounded within the restraining works erected.

SEC. 18. That the said commission may at any time when the condition of the navigable rivers or when the capacities of all impounding and settling facilities erected by mine owners or such as may be provided by government authority require same, modify the order granting the privilege to mine by the hydraulic mining process so as to reduce amount thereof to meet the capacities of the facilities then in use, or, if actually required in order to protect the navigable rivers from damage, may revoke same until the further notice of the commission.

SEC. 19. That an intentional violation on the part of a mine owner or owners, company, or corporation, or the agents or the employees of either, of the conditions of the order granted pursuant to section thirteen, or such modifications thereof as may have been made by said commission, shall work a forfeiture of the privileges

thereby conferred, and upon notice being served by the order of said commission upon such owner or owners, company or corporation, or agent in charge, work shall immediately cease. Said commission shall take necessary steps to enforce its orders in case of the failure, neglect, or refusal of such owner or owners, company or corporation, or agents thereof, to comply therewith, or in the event of any person or persons, company or corporation working by said process in said territory contrary to law.

SEC. 20. That said commission, or committee therefrom or officer of said crops assigned to duty under its orders, shall, whenever deemed necessary, visit said territory and all mines operating under the provisions of this act. A report of such examination shall be placed on file.

SEC. 21. That the said commission is hereby granted the right to use any of the public lands of the United States, or any rock, stone, timber, trees, brush, or material thereon or therein, for any of the purposes of this act; and the secretary of the interior is hereby authorized and requested, after notice has been filed with the commissioner of the general land office by said commission, setting forth what public lands are required by it under the authority of this section, that such land or lands shall be withdrawn from sale and entry under the laws of the United States.

SEC. 22. That any person or persons who wilfully or maliciously injure, damage, or destroy, or attempt to injure, damage or destroy, any dam or other work erected under the provisions of this act for restraining, impounding, or settling purposes, or for use in connection therewith, shall be guilty of a misdemeanor, and upon conviction thereof shall be fined not to exceed the sum of five thousand dollars or be imprisoned not to exceed five years, or by both such fine and imprisonment, in the discretion of the court. And any person or persons, company or corporation, their agents or employees, who shall mine by the hydraulic process directly or indirectly injuring the navigable waters of the United States, in violation of the provisions of this act, shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding five thousand dollars, or by imprisonment not exceeding one year, or by both such fine and imprisonment, in the discretion of the court; *provided*, that this section shall take effect on the first day of May, eighteen hundred and ninety-three.

SEC. 23. That upon the construction by the said commission of dams or other works for the detention of debris from hydraulic mines and the issuing of the order provided for by this act to any individual, company, or corporation to work any mine or mines by hydraulic process, the individual, company, or corporation operating thereunder working any mine or mines by hydraulic process, the debris from which flows into or is in whole or in part restrained by such dams or other works erected by said commission, shall pay a tax of three per centum on the gross proceeds of his, their, or its mine so worked; which tax of three per centum shall be ascertained and paid in accordance with regulations to be adopted by the secretary of the treasury, and the treasurer of the United States is hereby authorized to receive the same. All sums of money paid into the treasury under this section shall be set apart and credited to a fund to be known as the "Debris Fund," and shall be expended by said commission under the supervision of the chief of engineers and direction of the secretary of war, in addition to the appropriations made by law in the construction and maintenance of such restraining works and settling reservoirs as may be proper and necessary; *provided*, that said commission is hereby authorized to receive and pay into the treasury from the owner or owners of mines worked by the hydraulic process, to whom permission may have been granted so to work under the provisions thereof, such money advances as may be offered to aid in the construction of such impounding dams or other restraining works, or settling reservoirs, or sites therefor, as may be deemed necessary by said commission to protect the navigable channels of said river systems, on condition that all moneys so advanced shall be refunded as the said tax is paid into the said debris fund; *and provided, further*, that in no event shall the government of the United States be held liable to refund same except as directed by this section.

SEC. 24. That for the purpose of securing harmony of action and economy of expenditures in the work to be done by the United States and the State of California, respectively, the former in its plans for the improvement and protection of the navigable streams and to prevent the depositing of mining debris or other materials within the same, and the latter in its plans authorized by law for the reclamation, drainage, and protection of its lands, or relating to the working of hydraulic mines, the said commission is empowered to consult thereon with a commission of engineers of said state, if authorized by said state for said purpose, the result of such conference to be reported to the chief of engineers of the United States army, and if by him approved shall be followed by said commission.

SEC. 25. That said commission, in order that such material as is now or may hereafter be lodged in the tributaries of the Sacramento and San Joaquin river systems resulting from mining operations, natural erosion, or other causes, shall be prevented from injuring the said navigable rivers or such of the tributaries of either as may be navigable and the land adjacent thereto, is hereby directed and empowered, when appropriations are made therefor by law, or sufficient money is deposited for that purpose in said debris fund, to build at such points above the head of navigation in said rivers and on the main tributaries thereof, or branches of such tributaries, or at any place adjacent to the same, which in the judgment of said commission will effect said object (the same to be of such material as will insure safety and permanency), such restraining or impounding dams and settling reservoirs, with such canals, locks, or other works adapted and required to complete same. The recommendations contained in executive document numbered two hundred and sixty-seven, fifty-first congress, second session, and executive document numbered ninety-eight, forty-seventh congress, first session, as far as they refer to impounding dams, or other restraining works are hereby adopted, and the same are directed to be made the basis of operations. The sum of fifteen thousand dollars is hereby appropriated, from moneys in the treasury not otherwise appropriated, to be immediately available to defray the expenses of said commission.

Approved March 1, 1893.

INSTRUCTIONS TO OWNERS AND OPERATORS OF HYDRAULIC MINES IN CALIFORNIA.

January 1, 1906.

1. The California Debris Commission is composed of three officers of the corps of engineers, United States army, who are appointed by the president of the United States, with the advice and consent of the senate, under the authority of the act of congress, approved March 1, 1893. The commission is charged by this act with the enforcement of its provisions, including such regulation and control of hydraulic mining in the drainage areas of the Sacramento and San Joaquin rivers of the State of California as is necessary to cause the tailings from such mining to be so impounded in the vicinity of the mine as to prevent injury to the navigable rivers and adjacent lands. The owners and operators of such mines are required by this law to comply strictly with such requirements of the commission as may be deemed necessary to effect this purpose. An extreme penalty of \$5,000 fine and one year's imprisonment is provided for violation of the act.

2. Hydraulic mining embraces all mining operations where water is used under pressure through a nozzle against any bank of earth, gravel, or other similar material, thus eroding the bank. It is forbidden by law except under the supervision of the commission.

3. The law requires that in all cases a license or written permission must be obtained from the commission before hydraulic mining in the regions mentioned can be legally carried on.

4. Licenses or permission to mine by the hydraulic process are revocable by the commission, and will not be given unless the requirements of the commission are complied with as to sufficiency of suitable restraining barriers or dams. Licenses,

when granted, will be suspended or revoked for failure to properly maintain such barriers or dams or for failure to make the reports and furnish information asked for by the commission.

5. Licenses are obtained by making application to the California Debris Commission, San Francisco, Cal., on the special blank form issued by the commission, copies of which will be sent on request, free of cost.

6. Licenses are not transferable and are valid only for the operations of the individual or company, and for the special mine named in the license.

7. By the terms of the law an application for a license must be advertised by the commission in the newspapers to allow any protests to be filed with the commission. This advertising usually takes about three weeks.

8. As soon as practicable after advertising an application, the sites proposed by the applicants for the restraining works are visited, and if found satisfactory, authority to construct the dams or barriers is given with the commission's specifications and instructions for the work. Any dam built before such authorization is built wholly at the builder's risk, and may not be accepted by the commission. Any variation in location or character of work from that specified by the commission may also cause rejection of the dam.

9. When such authorized dams are completed, the commission should be promptly notified so that an inspection may be made as soon as practicable thereafter. If found satisfactory, a revocable license to mine will be issued. *Until the license is issued it is illegal to mine.*

10. When mining has been begun under a license, a report every month must be submitted on one of the blank forms furnished for this purpose by the commission upon request. If no mining is carried on for any month, the small form is to be used, otherwise, the large form must be forwarded. All blank spaces should be carefully and accurately filled.

11. In case of any accident to a restraining dam affecting its efficiency, mining must immediately cease and the commission must be promptly notified.

12. When a dam becomes full of debris, mining must cease until more impounding capacity is provided either by raising the dam or by the construction of new dams. The permission of the commission must be obtained to raise dams, and the work when completed must be inspected and approved by the commission before mining may be resumed.

13. Dams must be kept water tight and a pool at least three feet deep must be maintained as a settling basin above each dam while mining is in progress. Leaks must be promptly checked.

14. Names of mines must not be changed without due notice to the commission.

15. No charges or fees of any kind are required or allowed, all expenses of inspection being borne by the United States.

16. The mine owners are usually expected to meet the inspector at the nearest railway or stage station and take him to the mine and back. As many regions where mines are located are inaccessible in winter time, applications for licenses and inspections should be submitted as early in the season as practicable. Delay in attending to this promptly may occasion the loss of considerable time if not an entire season.

17. To avoid delay due to loss of letters it is suggested that requests be repeated within a reasonable time, if not promptly acknowledged or acted upon. All communications should be addressed to the secretary, California Debris Commission, San Francisco, Cal.

By direction of the California Debris Commission.

L. H. RAND,
Major, Corps of Engineers, Secretary.

FORMS FOR LOCATION NOTICES.

The following forms for mineral location notices have been found to fill the requirements of the statutes¹:

NOTICE OF QUARTZ LODE LOCATION.

Notice is hereby given, That I, _____, a citizen of the United States, have discovered a vein of rock in place, carrying gold, silver, copper, and other valuable deposits, upon which I have erected a discovery monument and posted this notice, as hereinafter set forth; that in accordance with the provision of Chapter 6, Title 32 of the Revised Statutes of the United States and the laws of the State of California, I hereby claim fifteen hundred linear feet of said vein, measured thereon as hereinafter set forth. Said discovery was made on the _____ day of _____, 19____. Immediately upon making the same, and on the _____ day of _____, 19____, I erected at the point of discovery, a substantial monument, consisting of a mound of rocks and _____ and posted thereon this notice.

The * general course of said vein is _____ and _____. I claim in length thereon _____ feet _____ and _____ feet _____ from said discovery monument. I also claim three hundred feet on each side of the center of the vein. This vein or claim shall be known as and called the _____. It is situated in _____ Mining District, and in § Sec. _____, Tp. _____, R. _____, B. and M., in _____ County, California, and the discovery monument _____ being placed about § _____

from _____
That the following is a description of said location as marked on the ground: §
commencing at the _____ of said claim, a _____
_____ from which initial point the discovery monument is distant about _____ feet in a _____ direction; _____
thence || _____

Dated and posted on the ground, this _____ day of _____, 19____.

Witness _____

Locator.

*Make this description in accordance with the facts, as "The general course of said vein is north and south. I claim in length thereon 500 feet north and 1,000 feet south from said discovery monument."

†If the claim is upon surveyed land, give the section, township and range, if possible. This is not required by law, but makes a much better description.

§Here refer to some natural object or permanent monument so as to identify the locality of the claim, in compliance with section 2324, Revised Statutes U. S. A road, house, tree, known mountain or peak, government corner, mill, or known mining claim, are such objects or monuments. As, "About one mile directly east from John Doe's quartz mill and 400 rods west from the Last Hope mine," etc.

¶Here state: "Commencing at the N. E. corner of said claim, a mound of rocks 4 ft. high," or at any other corner or point in the boundary; give the distance and direction from this initial monument to the discovery monument, and then locate the discovery with reference to some natural object or permanent monument.

||Here follows a description of the claim from the initial monument. For instance: "Thence 600 ft. northwesterly to the N. W. corner of said claim, at which point is a mound of rocks 2½ ft. high, marked so-and-so (if marked); thence 1,500 ft. southwesterly to the S. W. corner of said claim, being a mound of rocks," etc.; so going around the claim to the point of beginning.

¹Wilson's Mining Laws, 1911, pp. 60-62.

NOTICE OF LOCATION OF PLACER CLAIM.

Notice is hereby given, That _____
citizen_____ of the United States, h_____ this _____ day of
_____, 19____, discovered a valuable placer deposit within the limits
of this claim; that by virtue of said discovery, _____
_____ ha_____ located, and hereby locate and claim the following described land,
situate in _____ Mining District, _____ County, California, to
wit: * _____ of section _____
Township _____, Range _____, B. and M., containing _____
acres.† Said claim is hereby named _____ Placer Claim.
Said claim is marked upon the ground as follows: ‡ _____

This notice is posted on a mound of rocks at the point of discovery, situated §

Dated and posted on the ground, this _____ day of _____, 19____.

Locator.

*The statute provides that the locator must give "a description of the claim by reference to legal subdivisions of sections, if the location is made in conformity with the public surveys; otherwise a description with reference to some natural object or permanent monument as will identify the claim."

†When not described by legal subdivisions, the description should conform to that contained in the final certificate of location of a lode claim.

‡The statute provides that, whether described by legal subdivisions or not, the location shall be marked by the locator on the ground, and as the affidavit to be filed later is not required to contain a description of the claim, we think this notice should state how the location is marked; as, for instance, "At the N. E. corner of said tract a mound of rocks 3 ft. high, marked so-and-so (if marked), and at the N. W. corner a stake in a mound of rocks, marked," etc., and so on for each monument enclosing the claim.

§Here state where the discovery is located, as, for instance, "20 feet S. W. of the N. E. corner monument."

A duplicate of this notice must be filed for record with the county recorder within thirty days from the discovery; and the locator is allowed thirty days to mark his location on the ground.

The foregoing form of placer notice may be used for location of all deposits which are classed under placer laws.

APPENDIX.

PUBLICATIONS OF THE CALIFORNIA STATE MINING BUREAU.

Publications of this Bureau will be sent on receipt of the requisite amount. Only stamps, coin or money orders will be accepted in payment.

Money orders should be made payable to the STATE MINING BUREAU.

Personal checks will not be accepted.

REPORTS.

Asterisk (*) Indicates the publication is out of print.

*Report	I.	Henry G. Hanks.	1880.		
*Report	II.	Henry G. Hanks.	1882.		
*Report	III.	Henry G. Hanks.	1883.		
*Report	IV.	Henry G. Hanks.	1884.		
*Report	V.	Henry G. Hanks.	1885.		
*Report	VI.	Part 1.	Henry G. Hanks.	1886.	
*Report	VI.	Part 2.	Wm. Ireland, Jr.	1886.	
*Report	VII.	Wm. Ireland, Jr.	1887.		
*Report	VIII.	Wm. Ireland, Jr.	1888.		
*Report	IX.	Wm. Ireland, Jr.	1889.		
*Report	X.	Wm. Ireland, Jr.	1890.		
Report	XI.	Wm. Ireland, Jr.	1892.	(First biennial)	Price.
*Report	XII.	J. J. Crawford.	1894.	(Second biennial)	\$1.00
*Report	XIII.	J. J. Crawford.	1896.	(Third biennial)	
Chapters of State Mineralogist's Report, F. McN. Hamilton:					
Mines and Mineral Resources of Imperial and San Diego counties—F. J. H. Merrill.					
		1914			.35

BULLETINS.

*Bulletin	1.	Desiccated Human Remains.—Winslow Anderson.	1888		
*Bulletin	2.	Methods of Mine Timbering.—W. H. Storms.	1894		
*Bulletin	3.	Gas and Petroleum Yielding Formations of the Central Valley of California.—W. L. Watts.	1894		
*Bulletin	4.	Catalogue of California Fossils (Parts 2, 3, 4 and 5).—J. G. Cooper.	1894		
*Bulletin	5.	The Cyanide Process: Its Practical Application and Economical Results.—A. Scheidel.	1894		
Bulletin	6.	California Gold Mill Practices.—E. B. Preston.	1895		\$1.50
*Bulletin	7.	Mineral Production of California, by Counties, 1894.—Chas. G. Yale.	(Tabulated sheet)		
*Bulletin	8.	Mineral Production of California, by Counties, 1895.—Chas. G. Yale.	(Tabulated sheet)		
Bulletin	9.	Mine Drainage, Pumps, etc.—Hans C. Behr.	1896		.60
*Bulletin	10.	A Bibliography Relating to the Geology, Palæontology, and Mineral Resources of California.—A. W. Vogdes.	1896		
*Bulletin	11.	Oil and Gas Yielding Formations of Los Angeles, Ventura and Santa Barbara Counties.—W. L. Watts.	1896		
*Bulletin	12.	Mineral Production of California, by Counties, 1896.—Chas. G. Yale.	(Tabulated sheet)		
*Bulletin	13.	Mineral Production of California, by Counties, 1897.—Chas. G. Yale.	(Tabulated sheet)		
*Bulletin	14.	Mineral Production of California, by Counties, 1898.—Chas. G. Yale.	(Tabulated sheet)		
Bulletin	15.	Map of Oil City Oil Fields, Fresno County.—J. H. Means.			
*Bulletin	16.	The Genesis of Petroleum and Asphaltum in California.—A. S. Cooper.	1899		
*Bulletin	17.	Mineral Production of California, by Counties, 1899.—Chas. G. Yale.	(Tabulated sheet)		
*Bulletin	18.	The Mother Lode Region of California.—W. H. Storms.	1900		
*Bulletin	19.	Oil and Gas Yielding Formations of California.—W. L. Watts.	1900		
*Bulletin	20.	Synopsis of General Report of State Mining Bureau.—W. L. Watts.	1903		
*Bulletin	21.	Mineral Production of California, by Counties, 1900.—Chas. G. Yale.	(Tabulated sheet)		
*Bulletin	22.	Mineral Production of California for Fourteen Years.—Chas. G. Yale.	1900. (Tabulated sheet)		
Bulletin.		Reconnaissance of the Colorado Desert Mining District—Stephen Bowers.	1901		
Bulletin	23.	The Copper Resources of California.—P. C. DuBois, F. M. Anderson, J. H. Tibbits, and G. A. Tweedy.	1902		.50
*Bulletin	24.	The Saline Deposits of California.—G. E. Bailey.	1902		
*Bulletin	25.	Mineral Production of California, by Counties, 1901.—Chas. G. Yale.	(Tabulated sheet)		

PUBLICATIONS OF THE CALIFORNIA STATE MINING BUREAU—Continued.

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		Price.
*Bulletin 26.	Mineral Production of California for Fifteen Years.—Chas. G. Yale. 1901. (Tabulated sheet)-----	---
Bulletin 27.	The Quicksilver Resources of California.—Wm. Forstner. 1903-----	.75
*Bulletin 28.	Mineral Production of California, by Counties, 1902.—Chas. G. Yale. (Tabulated sheet)-----	---
*Bulletin 29.	Mineral Production of California for Sixteen Years.—Chas. G. Yale. 1902. (Tabulated sheet)-----	---
*Bulletin 30.	A Bibliography of Geology, Palæontology, and Mineral Resources of California.—A. W. Vogdes. 1903-----	---
Bulletin 31.	Chemical Analyses of California Petroleum.—H. N. Cooper. 1903. (Tabulated sheet)-----	---
Bulletin 32.	Production and Use of Petroleum in California.—P. W. Prutzman. 1904-----	.25
*Bulletin 33.	Mineral Production of California, by Counties, 1903.—Chas. G. Yale. (Tabulated sheet)-----	---
*Bulletin 34.	Mineral Production of California for Seventeen Years.—Chas. G. Yale. 1903. (Tabulated sheet)-----	---
*Bulletin 35.	Mines and Minerals of California for 1903.—Chas. G. Yale. 1904. (Statistical)-----	---
*Bulletin 36.	Gold Dredging in California.—J. E. Doolittle. 1905-----	---
Bulletin 37.	Gems, Jewelers' Materials, and Ornamental Stones of California. —George F. Kunz. 1905:-----	---
	*First edition (without colored plates)-----	.25
	*Second edition (with colored plates)-----	---
*Bulletin 38.	The Structural and Industrial Materials of California.—Wm. Forstner, T. C. Hopkins, C. Naramore, L. H. Eddy. 1906-----	---
*Bulletin 39.	Mineral Production of California, by Counties, 1904.—Chas. G. Yale. (Tabulated sheet)-----	---
*Bulletin 40.	Mineral Production of California for Eighteen Years.—Chas. G. Yale. 1904. (Tabulated sheet)-----	---
*Bulletin 41.	Mines and Minerals of California for 1904.—Chas. G. Yale. (Statistical)-----	---
*Bulletin 42.	Mineral Production of California, by Counties, 1905.—Chas. G. Yale. (Tabulated sheet)-----	---
*Bulletin 43.	Mineral Production of California for Nineteen Years.—Chas. G. Yale. 1905. (Tabulated sheet)-----	---
*Bulletin 44.	Mines and Minerals of California for 1905.—Chas. G. Yale. (Statistical)-----	---
*Bulletin 45.	Auriferous Black Sands of California.—J. A. Edman. 1907-----	---
Bulletin 46.	General Index to Publications of the State Mining Bureau.—Com- piled by Chas. G. Yale. 1907-----	.30
*Bulletin 47.	Mineral Production of California, by Counties, 1906.—Chas. G. Yale. (Tabulated sheet)-----	---
*Bulletin 48.	Mineral Production of California for Twenty Years.—Chas. G. Yale. 1906. (Tabulated sheet)-----	---
*Bulletin 49.	Mines and Minerals of California for 1906.—Chas. G. Yale. (Statistical)-----	---
Bulletin 50.	The Copper Resources of California.—A. Hausmann, J. Krutt- schnitt, Jr., W. E. Thorne, J. A. Edman. 1908-----	1.00
*Bulletin 51.	Mineral Production of California, by Counties, 1907.—D. H. Walker, Statistician. (Tabulated sheet)-----	---
*Bulletin 52.	Mineral Production of California for Twenty-one Years.—D. H. Walker, Statistician. 1907. (Tabulated sheet)-----	---
*Bulletin 53.	Mineral Productions of California for 1907, with County Maps.— D. H. Walker, Statistician. 1908 (Statistical)-----	---
*Bulletin 54.	Mineral Production of California, by Counties, 1908.—D. H. Walker, Statistician. (Tabulated sheet)-----	---
*Bulletin 55.	Mineral Production of California for Twenty-two Years.—D. H. Walker, Statistician. 1908. (Tabulated sheet)-----	---
*Bulletin 56.	Mineral Productions for 1908, County Maps, and Mining Laws of California.—D. H. Walker. 1909. (Statistical)-----	---
Bulletin 57.	Gold Dredging in California.—W. B. Winston, Charles Janin. 1910. (paper)-----	1.50
	(cloth bound)-----	2.00
*Bulletin 58.	Mineral Production of California, by Counties, 1909.—D. H. Walker, Statistician. (Tabulated sheet)-----	---
*Bulletin 59.	Mineral Production of California for Twenty-three Years.—D. H. Walker, Statistician. 1909. (Tabulated sheet)-----	---
*Bulletin 60.	Mineral Production for 1909, County Maps, and Mining Laws of California.—D. H. Walker. 1910. (Statistical)-----	---
*Bulletin 61.	Mineral Production of California, by Counties, for 1910.—D. H. Walker, Statistician. (Tabulated sheet)-----	---
Bulletin 62.	Mineral Production of California for Twenty-four Years.—D. H. Walker, Statistician. 1910. (Tabulated sheet)-----	---
Bulletin 63.	Petroleum in Southern California.—P. W. Prutzman. 1912-----	.75
Bulletin 64.	Mineral Production for 1911.—E. S. Boalich, Statistician, 1912-----	---
Bulletin 65.	Mineral Production for 1912.—E. S. Boalich, Statistician, 1913-----	---
*Bulletin 66.	Mining Laws, United States and California, 1914-----	---
Bulletin 67.	Minerals of California.—A. S. Eakle. 1914-----	1.00
Bulletin 68.	Mineral Production for 1913.—E. S. Boalich. 1914-----	---
Bulletin 69.	Petroleum Industry of California, with Folio of Maps (18x22 in.) —R. P. McLaughlin and C. A. Waring. 1914-----	2.00
Bulletin 70.	Mineral Production for 1914, with Mining Law Appendix. 1915-----	---

PUBLICATIONS OF THE CALIFORNIA STATE MINING BUREAU—Continued.

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REGISTERS OF MINES WITH MAPS.

	Price.
Amador County -----	\$.25
Butte County -----	.25
*Calaveras County -----	-----
*El Dorado County -----	-----
*Inyo County -----	-----
*Kern County -----	-----
Lake County -----	.25
Mariposa County -----	.25
*Nevada County -----	-----
*Placer County -----	-----
*Plumas County -----	-----
*San Bernardino County -----	-----
*San Diego County -----	-----
Santa Barbara County -----	.25
*Shasta County -----	-----
*Sierra County -----	-----
*Siskiyou County -----	-----
*Trinity County -----	-----
*Tuolumne County -----	-----
Yuba County -----	.25
Register of Oil Wells (with map), Los Angeles City -----	.35

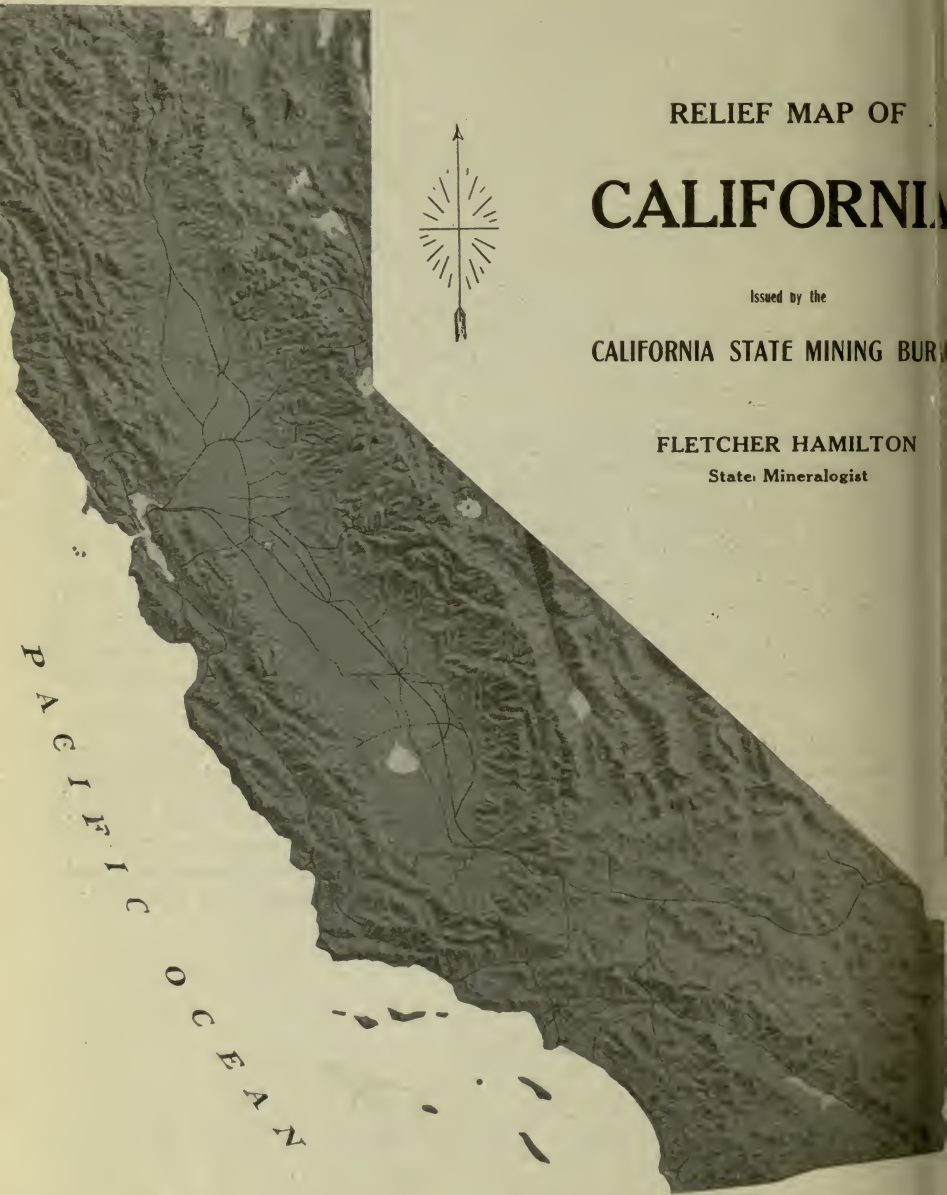
OTHER MAPS.

California, Showing Mineral Deposits (50x60 ins.)—	
Mounted -----	\$1.50
Unmounted -----	.30
Forest Reserves in California—	
Mounted -----	.50
Unmounted -----	.30
Mineral and Relief Map of California -----	.25
El Dorado County, Showing Boundaries of National Forests -----	.20
Madera County, Showing Boundaries of National Forests -----	.20
Placer County, Showing Boundaries of National Forests -----	.20
Shasta County, Showing Boundaries of National Forests -----	.20
Sierra County, Showing Boundaries of National Forests -----	.20
Siskiyou County, Showing Boundaries of National Forests -----	.20
Trinity County, Showing Boundaries of National Forests -----	.45
Tuolumne County, Showing Boundaries of National Forests -----	.20
*Mother Lode Region -----	-----
Desert Region of Southern California -----	.10
Minaret District, Madera County -----	.20
Copper Deposits in California -----	.05
Calaveras County -----	.25
Plumas County -----	.25
Tuolumne County -----	.25

DETERMINATION OF MINERAL SAMPLES.

Samples (limited to three at one time) of any mineral found in the State may be sent to the Bureau for identification, and the same will be classified free of charge. No samples will be determined if received from points outside the State. It must be understood that no Assays, or Quantitative Determinations will be made. Samples should be in lump form if possible, and marked plainly with name of sender on outside of package, etc. No samples will be received unless delivery charges are prepaid. A letter should accompany sample, giving locality where mineral was found and the nature of the information desired.

The following county maps show all towns, postoffices, railroads and stage lines and distances between points. They are especially valuable to all who wish to leave the railroad and penetrate to the interior of the mining districts of the State. These maps must not be reproduced without obtaining permission from the Mining Bureau.



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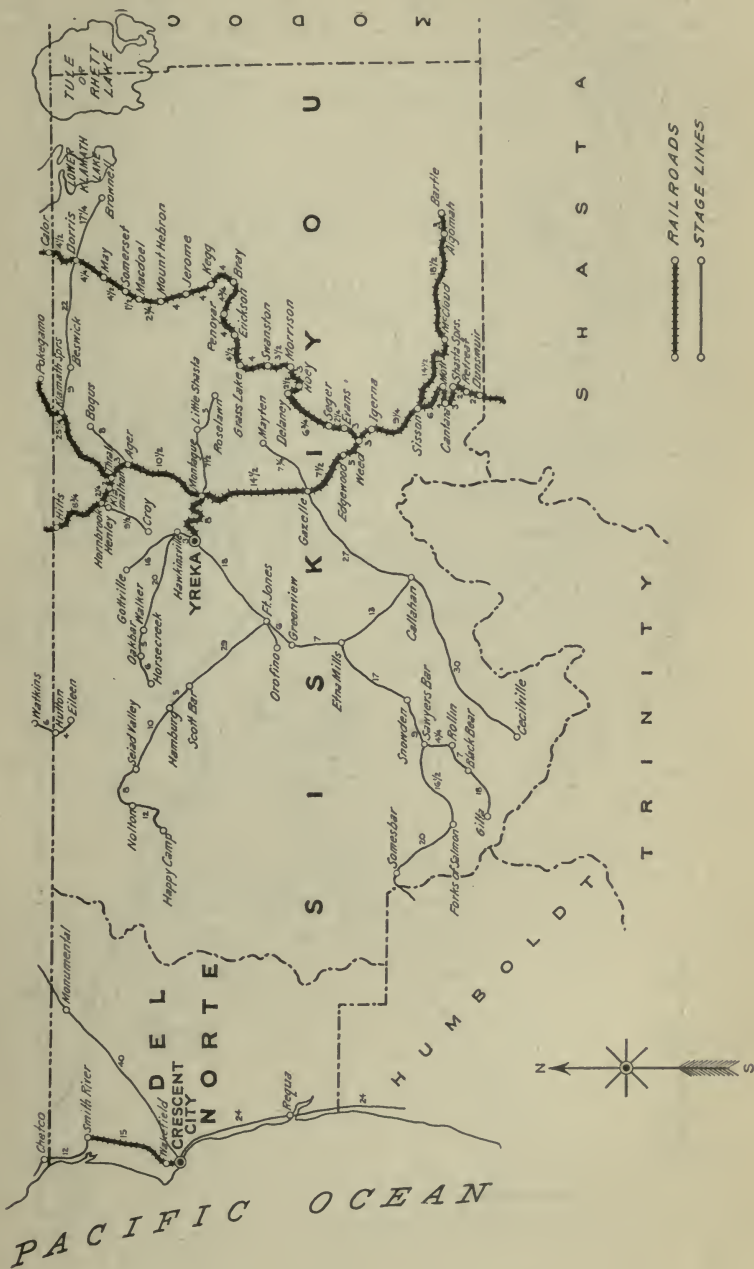
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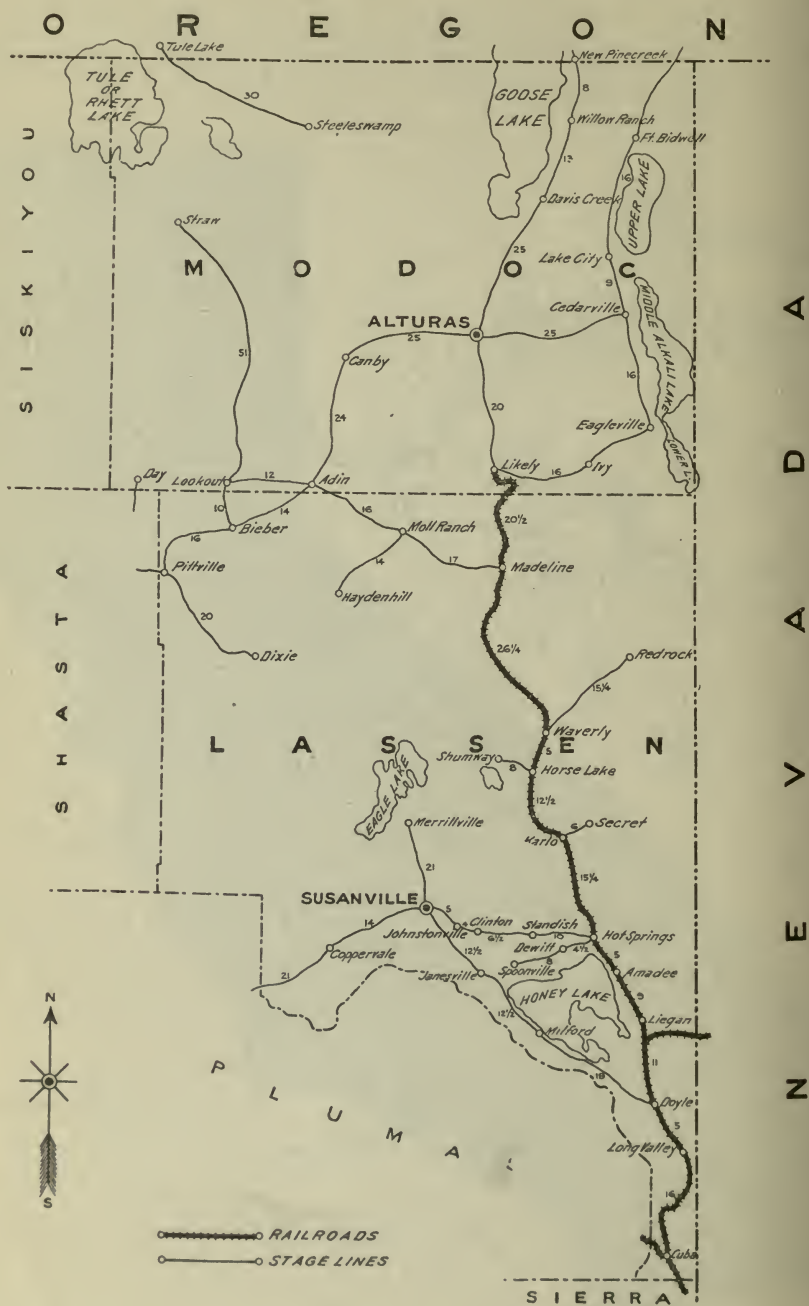
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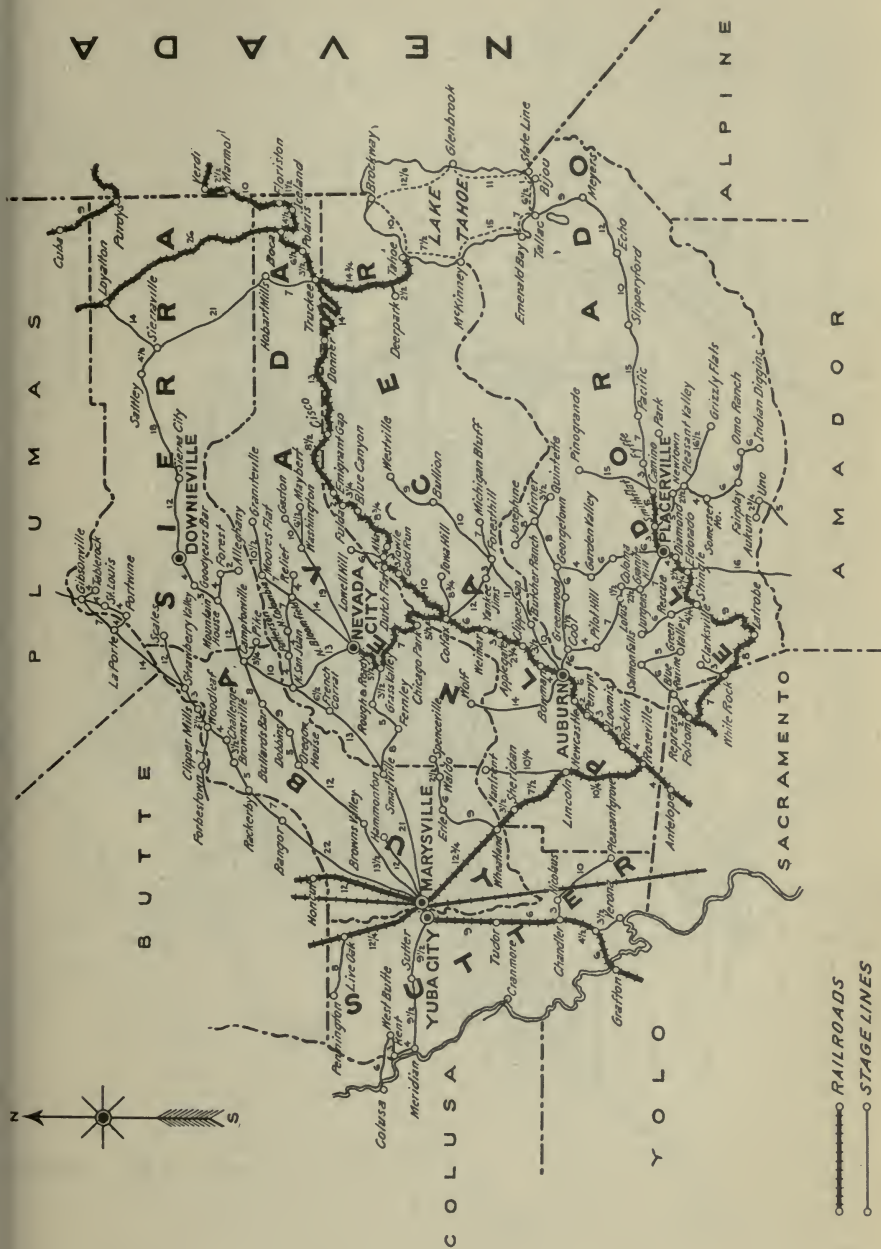
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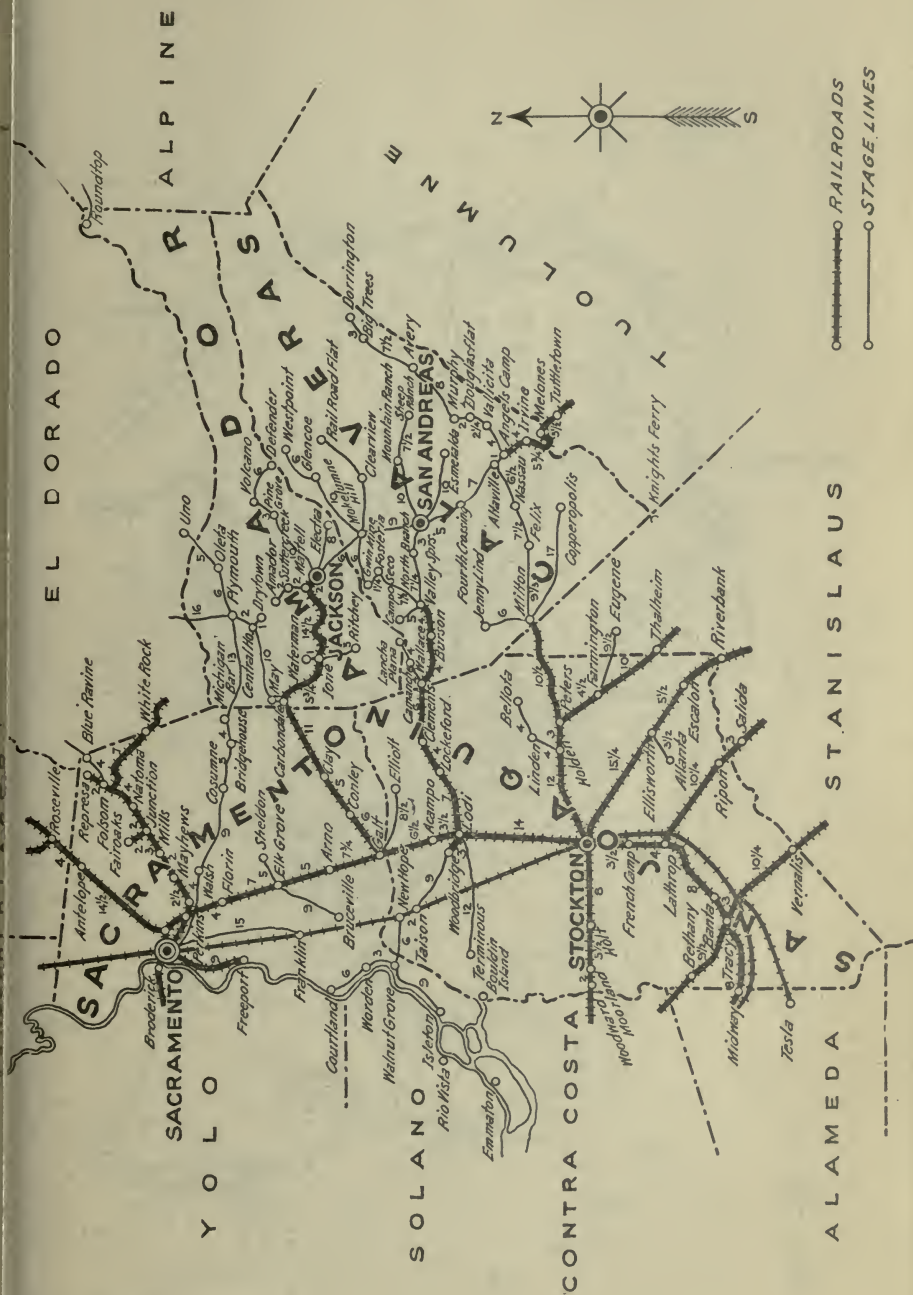
FLETCHER HAMILTON

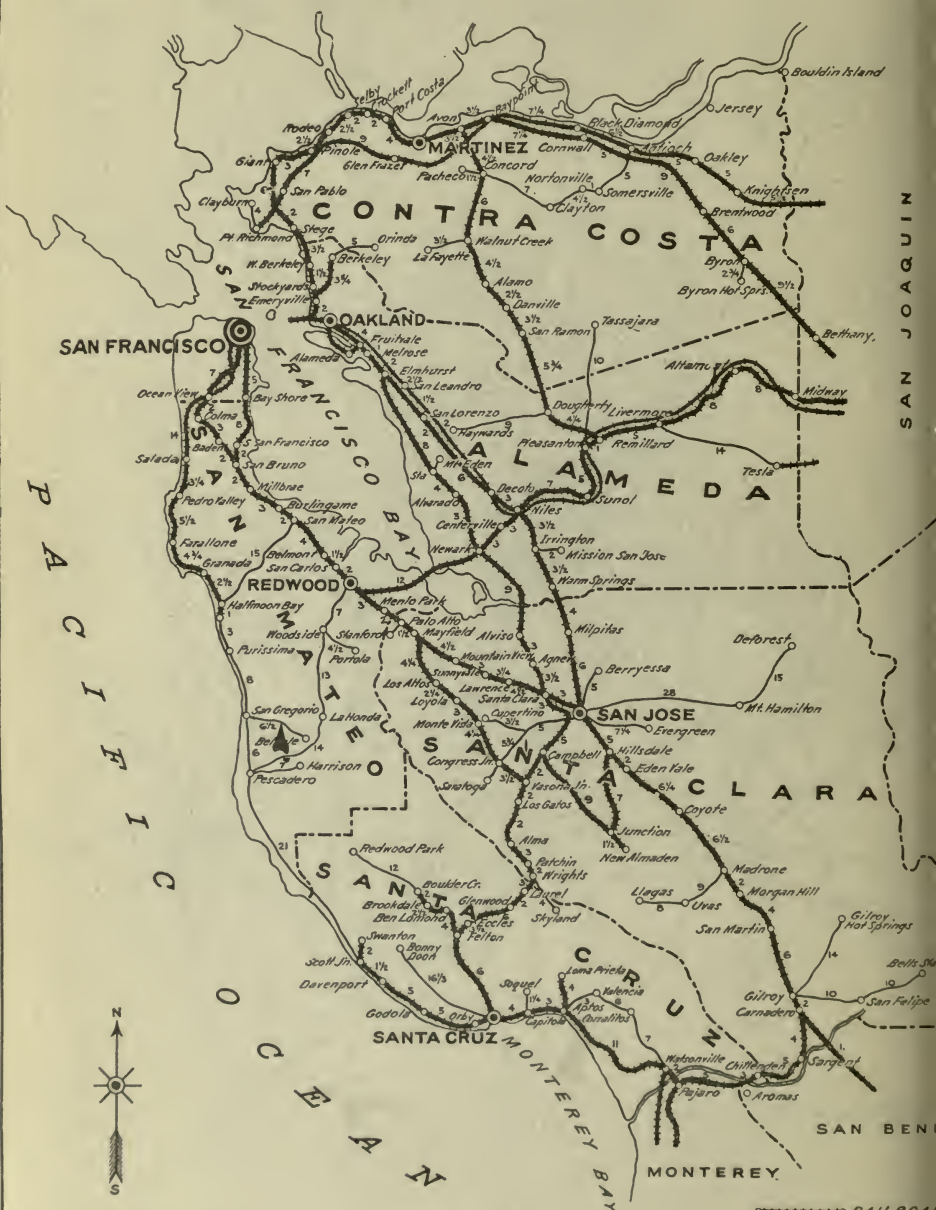
State Mineralogist

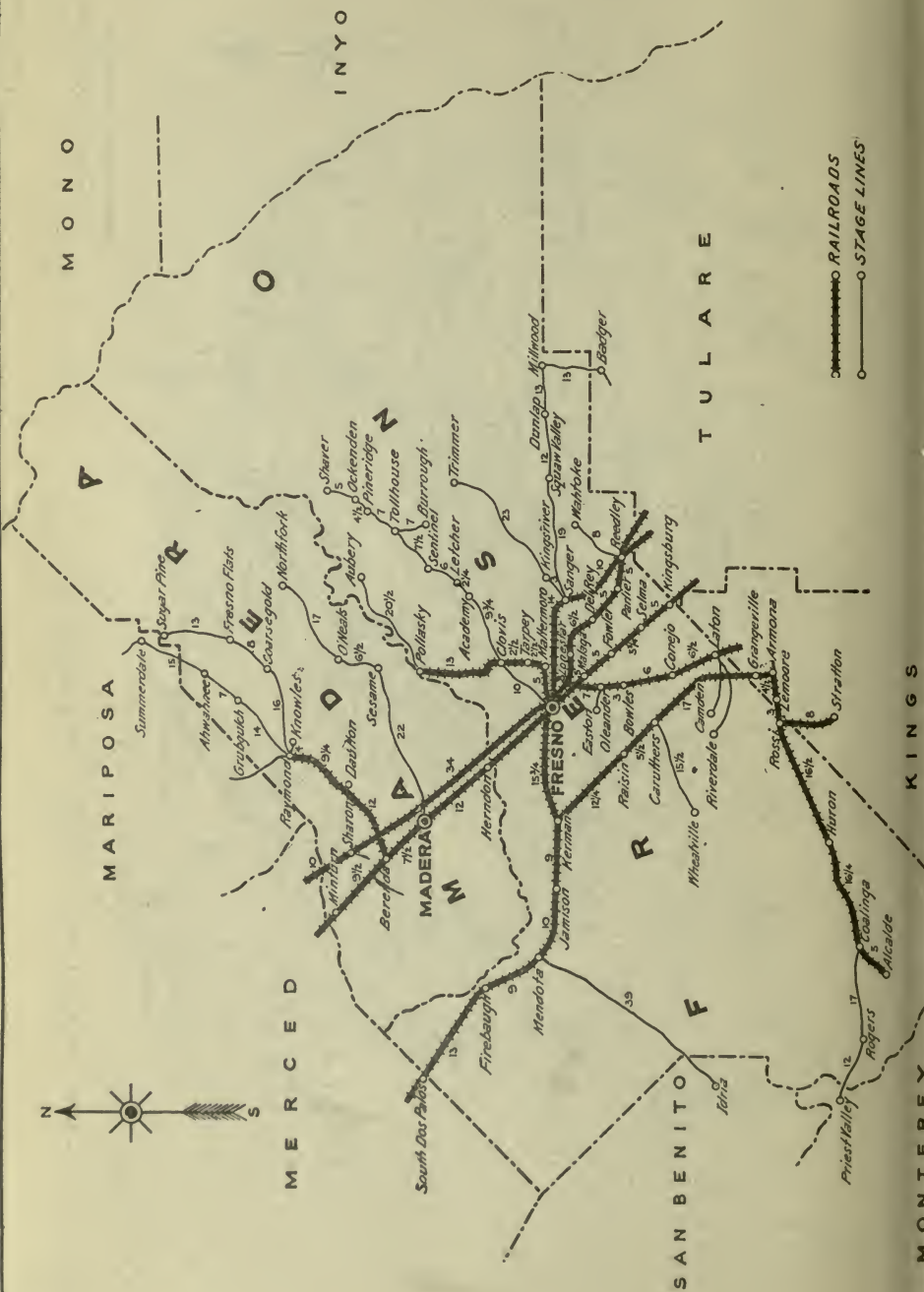




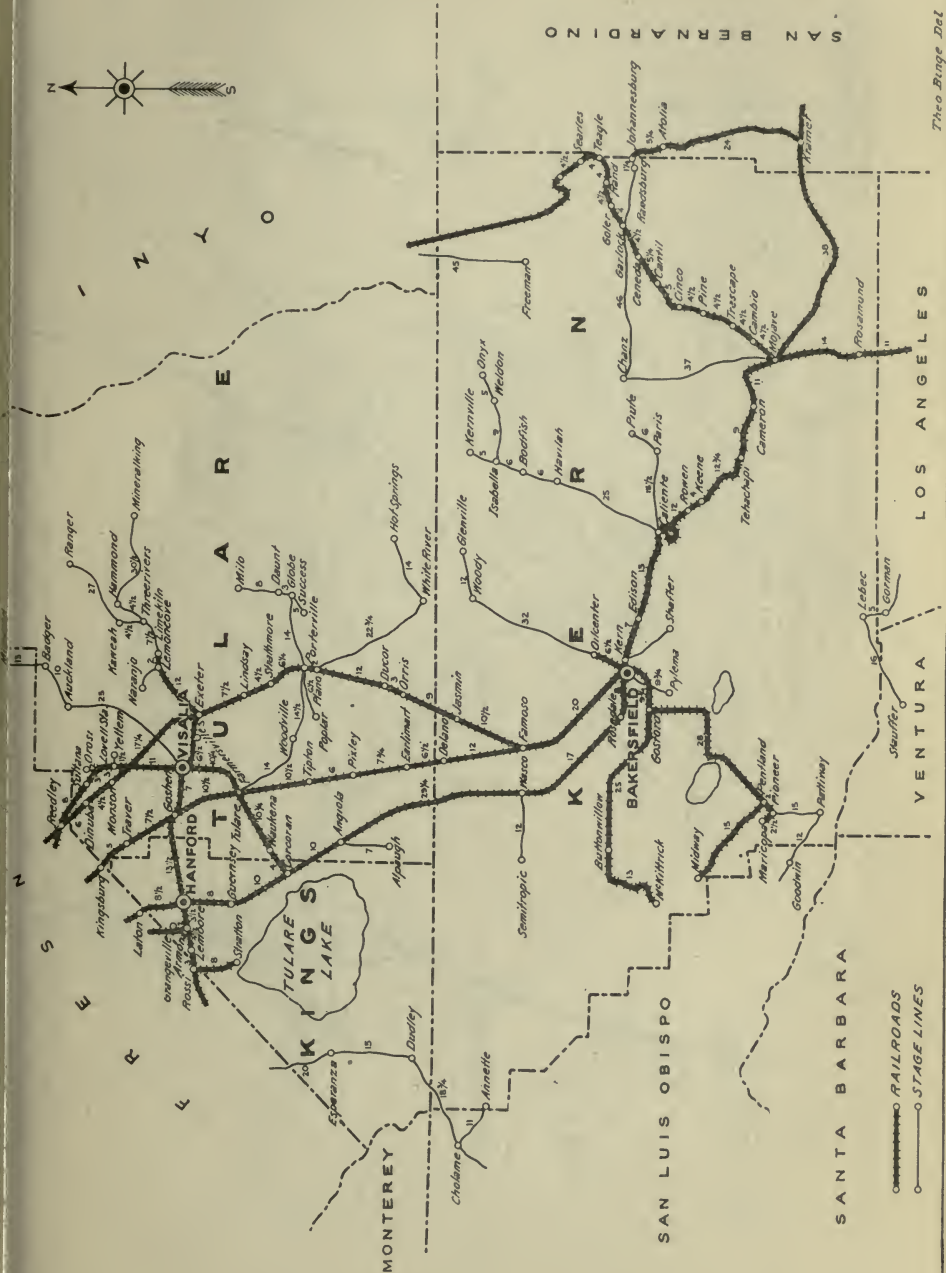








RAILROADS
STAGE LINES



RAILROADS
STAGE LINES



EL DORADO

MONO

ALPINE
MARKLEEVILLE
AMADOR
CALAVERAS

FRESNO

INDEPENDENCE

TOULUMNE
BRIDGEPORT

DAVIS

IN

DEATH VALLEY

IN

DAVIS

TULARE

OWENS LAKE
KEALER
LONG PINE
THESLA
OWENBY
WHITNEY
CITRUS

DAVIS

MARIPOSA
FRESNO

DAVIS

IN

IN

DEATH VALLEY

IN

FRESNO

MILLICAPPAUGH
DARRIN
SHILOO
GREENMEATER
RYAN
DEATH VALLEY LK
SCANTON
LELAND
LEE
CRATER
MONO LAKE
LUNDY
BADGE
MASONIC
SPECKMETER
COLVILLE
LOANES
WOODPORT
FREDERICKSBURG
SHERIDAN
ROUND VALLEY
BENTON
STATION
BUENA VISTA
DYE
OXLEY
ROUND VALLEY
LANS

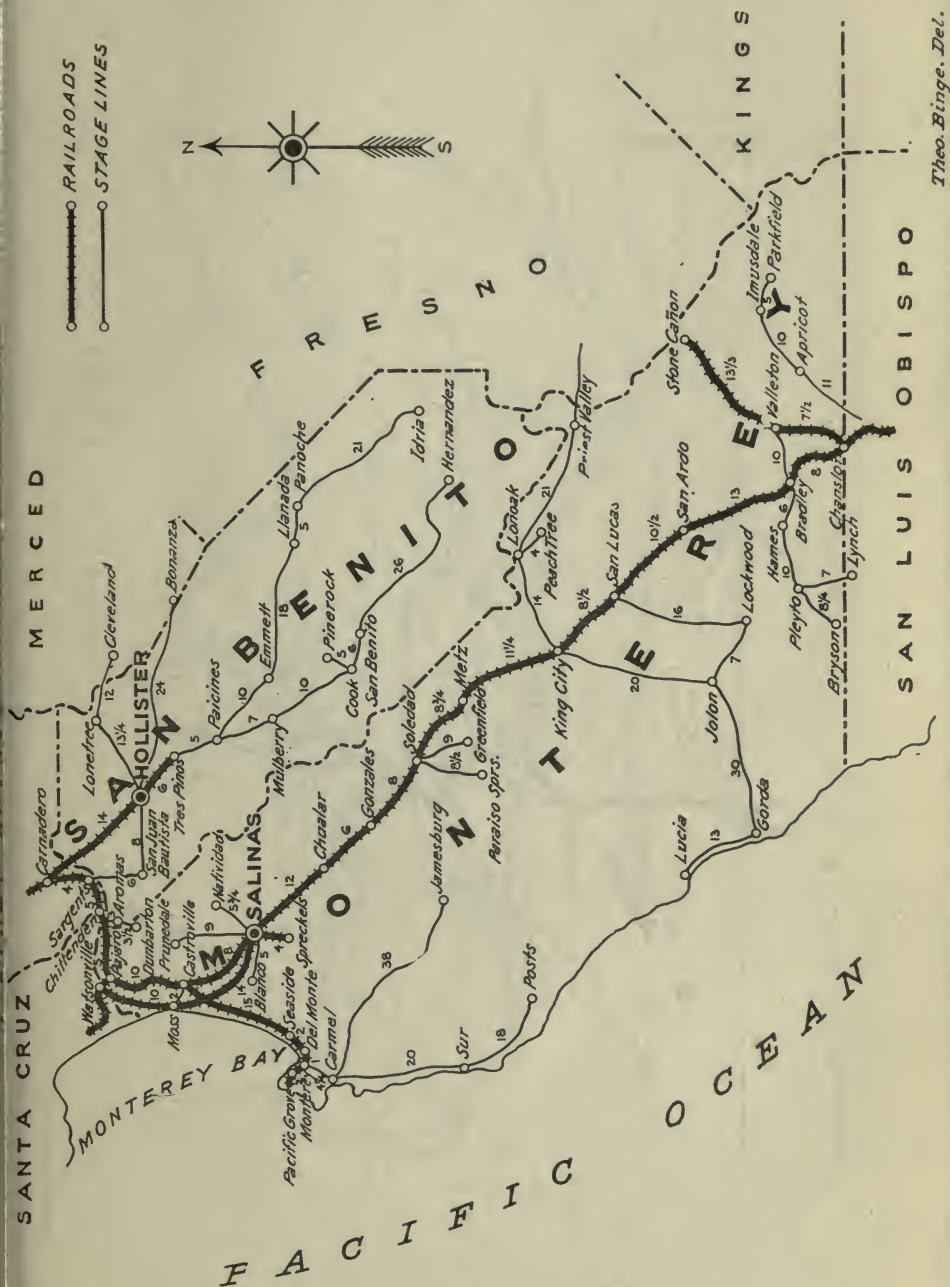
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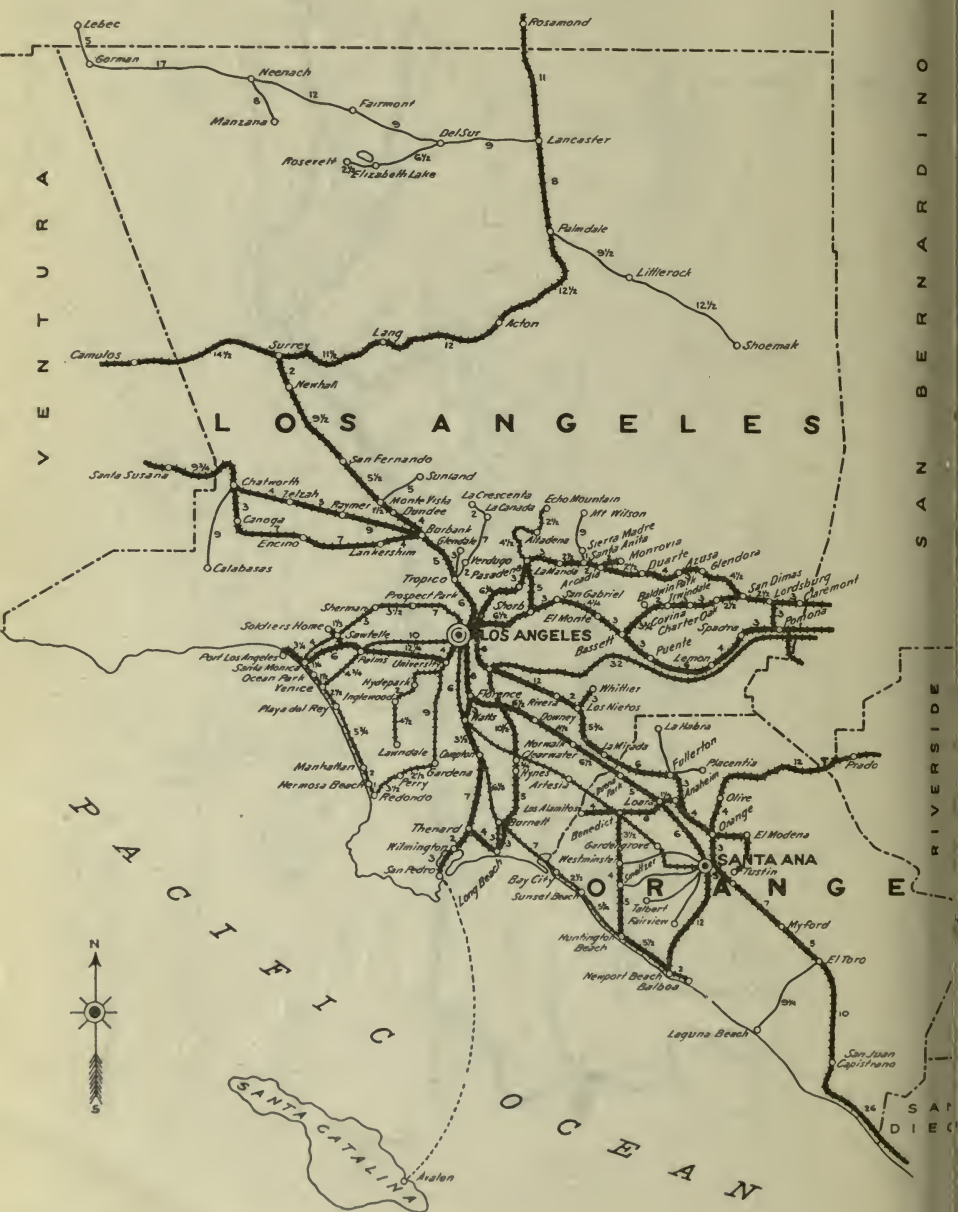
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RAILROADS
STAGE LINES

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